Department of the Army
Omaha District, Corps of Engineers
Montana Regulatory Office
10 West 15th Street, Helena, Montana 59626

MONTANA STREAM MITIGATION PROCESS (SMP) – February 24, 2005

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GENERAL INFORMATION

1. Applicability. This document defines the compensatory Stream Mitigation Process (SMP) for the state of Montana. It describes the method for quantifying the adverse impacts (debits) and the acceptable compensatory mitigation (credits) in relation to a project that would result in more than minimal adverse impacts to a stream. It is applicable to Corps regulatory actions requiring compensatory mitigation for adverse ecological effects where more rigorous, detailed functional assessment techniques such as the Hydrogeomorphic (HGM) methodology, are not considered practical or necessary. The following points are noted.

- All types of stream systems (ephemeral, intermittent or perennial) can be evaluated under this SMP. Impacts to streams are calculated based upon the type of impact in combination with overall linear footage, ultimately defined as "debits.

- For impacts to streams where impacts extend to adjacent or neighboring wetlands, this SMP will be used to calculate mitigation for the stream and the Helena Regulatory Office-Montana Ratios, 2003, will be used to calculate wetland mitigation on an acreage basis for the wetland impacts. Functional assessment tools could be applied on a case-by-case basis for wetlands.

- Some applicant-sponsored projects may require both stream and wetland mitigation to offset adverse impacts. Not all projects will require mitigation, as noted herein (Appendix E, pg 37)). Compensatory stream mitigation requirements will be determined on a case-by-case basis.

- This SMP does not address mitigation for categories of effects other than permitted activities. Types of mitigation other than compensation (e.g., avoidance, minimization, reduction) are not addressed by this SMP. This SMP does not obviate or modify any requirements of the 404(b)(1) Guidelines or other applicable documents regarding avoidance, sequencing, and minimization. Such requirements shall be evaluated during consideration of permit applications. This SMP was developed in coordination with State and Federal agencies to enhance its effectiveness and acceptability. When this SMP is used in the establishment of a mitigation bank, the Army Corps of Engineers (Corps) will consult with the Mitigation Bank Review Team (MBRT), with the goal of achieving a consensus of the MBRT regarding the factors, elements, and design of the Mitigation Banking Instrument. Also, note that this document is subject to periodic review and modification. .

- This SMP is developed from other Corps District procedures (primarily Charleston and Savannah) that have been in effect for several years. Corps Regulatory Guidance Letter 02-2 was also referenced and it is intended that this SMP be compatible with this and other Corps RGLs.

2. Purpose. The intent of this SMP is to provide a basic written framework that will provide predictability and consistency for the development, review, and approval of compensatory stream mitigation plans. A key element of this SMP is the establishment of a method for calculating compensatory mitigation debits and credits. While this method is not intended for use as project design criteria, appropriate application of the method should minimize uncertainty in the development and approval of mitigation plans and allow expeditious review of applications. However, nothing in this SMP should be interpreted as a promise or guarantee that a project that follows the processes described herein will be assured of approval. Following the guidelines herein does not confer any absolute guarantee of mitigation acceptability. Site specifics of a particular project may warrant alternative mitigation requirements.

3. Projects Not Requiring Mitigation. Due to minimal or no adverse impacts to aquatic resources, no compensatory mitigation may be necessary for certain types and sizes of projects. Section 323.4 of the Federal Clean Water Act (33 CFR Parts 320-330) lists specific types of activities that are exempt from regulation and are listed in Appendix E, page 37. Also listed are descriptions of activites that are regulated, but because of their minimal or nominal adverse impact to aquatic resources, will not require mitigation.

4. Corps Regulatory Policy on Stream Mitigation. In addition to the policies and requirements set forth in this document, other Federal, State or local agencies within Montana may require additional mitigation. The policies and regulations regarding mitigation can change and it is possible that new guidance will result in periodic modifications to this SMP. Efforts have been made in the preparation of this document to incorporate the most recent Corps policy. If a discrepancy is discovered within and it appears in conflict with any relevant Corps policy, users should notify the Corps of the item and the Corps will review relevant policy, obtain clarification, and modify the SMP as necessary.

5. Mitigation Objectives. Mitigation must be designed in accordance with the following guidelines.

5.1. Objectives. The Council on Environmental Quality has defined at 40 CFR Part 1508.20 that *mitigation* includes:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- **Compensating for the impact by replacing or providing substitute resources or environments**.

Resource and regulatory agencies have adopted this definition to apply in a sequential manner. Applicants must demonstrate first that they have avoided, minimized and have reduced potential adverse impacts to the aquatic resource before compensatory mitigation is considered.

The goal of compensatory mitigation shall be the restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters by replacing unavoidably lost stream functions as close as possible to the impact site. All such mitigation actions relate to one or more of the following.

- *Biological Integrity* involves the natural state of living organisms using aquatic systems. Biological functions include shelter, food production, breeding sites, and migration pathways.
- *Chemical Integrity* involves the natural composition and properties of inanimate substances within aquatic systems. Chemical functions include nutrient cycling, particulates retention, organic carbon export, removal and sequestration of elements and compounds, water quality improvement.
- *Physical Integrity* involves the natural contiguity of aquatic systems. Physical functions include flood attenuation, storm surge reduction, groundwater exchange, commercial and recreational navigation, and cultural uses such as swimming.

5.2. Possible Mitigation Activities.

A process for mitigation for unavoidable impacts to wetlands has been in place for approximately two decades in Montana. Impacts are based upon a determination and quantification (i.e., acres) of direct and indirect impacts to the wetland. Projects involving stream or stream bank manipulation may result in unavoidable impacts to the aquatic resources associated with the stream. Projects may also result in the

discharge of fill materials into the stream altering its physical, chemical or biological characteristics. These alterations can result in adverse impacts to aquatic resources that may require mitigation. Impacts may be in terms of direct fill or adverse modification of in-stream habitat or morphology, loss of natural stream function, loss or negative alterations of stream functions or similar results. Compensatory mitigation for adversely impacted streams will require a combination of in-stream restoration and riparian improvement. Activities that constitute restoration/improvement include, but are not limited to: stream channel restoration; non-rigid bank stabilization; impoundment removal; livestock exclusion/reduction devices and practices; road crossing improvements; removal of foreign objects from streams; fish screens and fish passage features; acquisition of a water right; creation of wildlife corridors; re-vegetation of riparian areas; creation of a floodplain and other similar actions. The intent is to promote in-stream, in-kind and on-site compensatory mitigation, in relation to where the adverse instream impacts will occur. It is also recognized that in some cases, riparian preservation/enhancement may be the most effective means of stream mitigation. For purposes of this SMP, a minimum of 25% of the required mitigation credits must be generated from in-stream developments. Preservation of existing aquatic and upland resources in buffer zones/riparian areas is also a component of stream mitigation. All restoration/enhancement measures should be designed with the goal of improving habitat, biological and morphological integrity, and water quality.

Information on stream restoration principles and techniques can be found in:

Stream Corridor Restoration: Principles, Processes and Practices, 1999, compiled by the Federal Interagency Stream Restoration Working Group, National Technical Information Service, Springfield, Virginia, Government Printing Office Item No. 0120-A.

Applied River Morphology, 1996, D.L. Rosgen. Wildland Hydrology Books, Pagosa Springs, Colorado

5.2.1. Stream Channel Restoration.

Stream stability is morphologically defined as the ability of the stream to maintain, over time, its dimension, pattern, and profile in such a manner that it is neither aggrading nor degrading and is able to transport without adverse consequence the flows and detritus of its watershed (Rosgen 1996). A number of factors can change the stability and function of streams including changes in stream flow, sediment regime, land use within the watershed, and direct disturbances (e.g., channelization, culverts, bridges and loss of bank stabilizing riparian vegetation) (Rosgen, 1996). Restoration of natural stream stability may require careful study by experts trained in stream geomorphology. It may involve changing channel width, bank stabilization measures, flow modification, grade control, stream routing changes to increase/decrease sinuosity and/or other measures to appropriately handle stream energy and reconnect the stream with its floodplain. It may entail basic changes in the stream's dimension, pattern and profile, consistent with stream type and valley slope, to re-establish stability. Reference reach data from a stream or stream(s) of the same target stream type (Rosgen, 1996) and from the same ecoregion should serve as a template for the design of the dimensions, pattern, profile, bed material and erosional processes of the stream targeted for restoration. It is important to develop restoration plans in consultation with appropriate resource and regulatory agencies.

5.2.2. Bank Modifications.

Bank erosion is a process that is an integral component of a streams overall stability and character. The rates of erosion and where it occurs depends upon the hydrology, geology, vegetation and land use at any one point in time. The benefits of bank erosion include the introduction of materials from which point bars are created or extended, that in turn provides substrate for riparian vegetation establishment, habitat creation, and maintenance of morphological characteristics. Bank erosion can also be viewed as a process

that needs correction before it results in damages to adjoining property. In some instances, anthropogenic actions result in accelerated rates of bank erosion that can exceed the streams sediment transport capacity and cause local deposition or stream aggradation over a given reach. For the purposes of this stream mitigation program, we will attempt to differentiate between natural and anthropogenically influenced erosion rates when determining mitigation obligations.

Bank stabilization can be accomplished using a variety of techniques. Techniques utilizing natural materials that mimic appropriate stream morphology, and in-stream features that allow a "natural" rate of bank erosion are preferred over those requiring the use of concrete, stone, rubble or other materials that may result in "locking" a naturally meandering channel into an inflexible pattern. Structures such as vanes, barbs, stone revetments, bendway weirs, root wad complexes, drop structures, check dams or engineered logjams that incorporate significant amounts of rock into their composition and that are intended to reduce energy at the bank interface may not be compatible with a maintaining a changing but balanced morphology. Installation of these types of bank stabilization features may be more acceptable in some stream types (Rosgen "a", "b"channels) than others (Rosgen "c" channel). It is important to note that just "patching" banks along an unstable channel may not address a more complex systemic instability problem and will garner little credit. Bank stability based upon establishing proper channel morphology, erosional and deposition rates, meander patterns and riparian vegetation should be emphasized. Measures that emphasize bank shaping/sloping, use of vegetation and riparian management are encouraged and will receive higher credit. Specific performance standards may be developed for any given project.

5.2.3. In Stream Habitat Recovery.

In stream habitat recovery is controlled by factors such as stream flow, channel structure, cover, water quality and condition of riparian corridors. Generally, to improve instream habitat, proposals including riparian management and/or creation of pool and riffle habitat are encouraged. For the purposes of this program, man-made structures are generally considered less desirable than those features that a stable channel may contain. Therefore, project designs should mimic natural features to the greatest extent practicable. Stable stream channels normally provide adequate habitat and caution is needed to ensure that proposed fish habitat structures such as rock/log vanes, cross-vanes, check dams and weir structures do not result in upsetting natural stream processes or improve one type of habitat at the expense of another. Instream structure proposals shall require a full morphological analysis to ensure that they do not alter the appropriate dimension, pattern, and profile for the stream type and introduce features that are anomalous to the stream. In addition, differing stream types may be incompatible with certain prescribed habitat structures (Rosgen, 1996). Where such man-made structures are deemed beneficial, periodic maintenance may be necessary and should be incorporated into project plans.

5.2.4. Impoundment Removal.

Dam removal is another acceptable form of stream restoration. Dams may adversely affect and fragment stream systems by altering the movement of aquatic organisms, water, sediment, organic matter, and nutrients; thereby, creating physical alterations in both tailwaters and downstream riparian zones and biological effects both upstream and downstream of the impoundment. Dam removal, if done properly, can restore a stream to its natural condition. However, without sufficient evaluation, dam removal may result in bed and bank instability and increased sediment loads. These impacts will occur until the stream reaches a state of dynamic equilibrium. Important elements to consider when doing dam removal include restoring fish passage, revegetating the reservoir area, and long term monitoring of sediment transfer, water quality, stream channel morphology and aquatic ecology.

5.2.5. *Livestock Exclusion*.

Where a documented problem exists, fencing and reduced grazing may be measures that can be used to manage livestock along streams thereby avoiding bank degradation, sedimentation, and water quality problems in streams. Livestock management is normally accomplished by fencing stream corridors and can include the construction of stream crossings with controlled access and stable, protected stream banks. Tank systems that provide off-stream livestock water is another management feature that would provide stream mitigation.

5.2.6. Road Crossing Improvements.

Road crossing improvements can, when constructed properly, provide enhancements to natural flow regimes by preventing scour and ponding and by connecting natural floodplains. Measures considered improvements include, but are not limited to, removal of culverts and bridges or replacing them with one that allows formation and creation of proper dimension/pattern/profiles, providing relief culverts in roadbeds acting as floodplain restrictions, and resetting or resizing culverts, which block fish passage and interfere with stream processes. It should be noted that removal of culverts could also result in instability of the stream channel.

5.2.7. Establishment of Natural Buffers.

Natural buffers provide functions such as surface runoff filtration, bank stabilization, stream shade, wildlife corridors, and contribution of woody debris and detritus. Buffer enhancement can be accomplished by revegetating with appropriate native riparian species and/or removal of exotics. Streams typically require additional buffer protection in comparison to wetlands. For purposes of getting buffer enhancement credit, buffer widths should be a minimum width of 50 feet or more depending on slope. Buffer zones can include aquatic and/or upland resources that can be preserved as is or enhanced for additional credits.

5.2.8. Other Enhancement.

The Corps, in consultation with other resource and regulatory agencies, will determine, on a case-by-case basis, the net benefit of mitigation actions that do not involve direct manipulation of a length of stream and/or its riparian buffers. These may include actions such as retrofitting storm water detention facilities, construction of off channel storm water detention facilities in areas where runoff is accelerating stream bank erosion and other watershed protection practices.

5.2.9. Acquisition of Wildlife Corridors/Crossings.

Acquisition, creation or restoration of critical wildlife corridors or crossings that would develop a corridor between streams and riparian areas could also be considered and accepted as mitigation. However, acquisition alone is considered as preservation and potential credits derived from acquisition cannot exceed 25% of total required credits.

5.2.10. Creation of Floodplains.

In some instances, natural or anthropogenic activities have or can result in severing the floodplain from the active stream channel. The result can be channel incisement, increased bed and bank erosion, lowering of the water table, reduced productivity in the riparian area and similar effects. Measures that result in re-establishment/creation and/or re-connection of the floodplain in relation to a bankfull discharge are normally considered beneficial and will receive credit under this program. The floodplain may be upland, wetland or a combination thereof.

5.3. Before and After Basis of Measure.

a. Pre-Construction Assessment. Units used in calculating required mitigation (debits) are based on the existing condition of the aquatic resource before project implementation, and its future without the proposed project. For example, if a riverine waterbody is to be impacted by impounding, then the debits shall be calculated based on the existing condition, which is riverine waters, not impounded waters. The stream reach proposed for alteration shall be evaluated as it existed prior to any recent (within approximately two years) alterations such as clearing, ditching, sedimentation, etc.

b. Post-Construction Assessment. Units used in calculating proposed mitigation credits are based on the conditions of the aquatic area expected to exist after the mitigation actions. For example, if a mitigation action restores an impounded waterbody to a natural riverine waterbody, then the proposed mitigation credits are calculated based on the units of the resulting riverine waters, not the existing impounded waters.

5.3.1. Impacts vs. Improvement.

a. Calculation of credits shall use linear feet, ultimately converted to credits, as the unit of measure. Measurements for streams shall be along the centerline of the channel. Mitigation tables and definitions of factors are defined in this SMP.

5.*4. Adverse Impacts Area.*

The area of adverse impacts as used in this document includes stream areas impacted by filling, excavating, flooding, draining, clearing, channelizing, straightening, shortening, canalizing, incising/entrenching, or other adverse actions. Other categories of effects such as aesthetic, cultural, historic, health, etc., are included in the Corps assessment of the project, but are not addressed by this Document, which is limited to physical/chemical/biological impacts to stream channels. For the purposes of this section, the terms effects or impacts includes:

- Direct effects, which are caused by the action and occur at the same time and place.
- Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

5.5. Mitigation Area.

In general, the adverse impacts and compensatory mitigation are geographically distinct areas. The aquatic area in which the adverse effects occur will generally not be given credits as part of the compensatory mitigation area. For example, an impoundment of a riverine system with a resulting increase in open surface water area or wetland fringe is not considered compensatory mitigation for the adverse impacts to the impounded riverine system. Incorporation of a mitigating design feature such as a bankfull riparian planting bench in a revetment is an example of an exception to this general rule.

A compensatory mitigation area may not be given credits under more than one mitigation category nor credited more than once under any category. However, it is acceptable to subdivide a given area into sub-areas and calculate credits for each sub-area separately. For example, a restored aquatic area donated to a conservancy organization may be credited as either restoration or preservation but not both. An aquatic area that is enhanced by improving hydrology and by buffering should be given one net enhancement credit calculation, not separate credits for both types of enhancement. An aquatic area that contains some restoration and some enhancement could be subdivided into a restoration area component and an enhancement area component, or the entire area could be lumped together and given one net enhancement/restoration credit calculation. Whether or not an area is subdivided or lumped for the purpose of credit calculations is a case-by-case decision based on what is reasonable and appropriate for the given mitigation proposal.

5.6. Buffer Zones.

Upland buffers adjacent to aquatic areas help maintain the biologic and chemical system. The relative importance of such buffers will depend upon a number of variables including the buffer width and condition, adjacent land uses and wildlife habitat requirements. Vegetated riparian buffers often provide the only filtering of surface runoff before it enters into streams. Buffer zones may be comprised of uplands, with or without aquatic components.

5.7. Restoration/Enhancement.

Restored and enhanced mitigation sites must be protected by deed restrictions or similar legal encumbrances. Proposed restoration/enhancement plans must include the following additional information.

- An explanation of what functions are being restored/enhanced and to what degree.
- A narrative description of how the restoration/enhancement will be accomplished.
- A narrative description of how the buffer will protect specific functions and/or resources.

5.8. Lakes, Ponds, and Impoundments.

Mitigation using lakes, ponds, and impoundments may be allowed as compensation for impacts to similar water bodies. *Mitigation using lakes, ponds, or impoundments will generally not be acceptable as compensatory mitigation for adverse impacts to wetlands or riverine systems.*

5.9. Location.

Where practicable and environmentally desirable, mitigation should be at or near to the project site and within the same watershed as the area of adverse impacts. Mitigation that fails to meet this standard will result in a lower credit calculation due to the kind and location factors in the tables. Distant or out-of-watershed compensatory mitigation may not be acceptable and must be approved on a case-by-case basis.

5.10. Timing.

When practicable and feasible, mitigation should be completed prior to or concurrent with the adverse impacts. The preferred method is to complete mitigation prior to the commencement of the impacts. However, it is recognized that because of equipment utilization it may be necessary to perform the mitigation concurrent with the overall project. This is usually acceptable provided the time lag between the impacts and mitigation is minimized and the mitigation is completed within one growing season following commencement of the adverse impacts. Justification should be provided for schedules showing less than 100% completion of the approved mitigation concurrent with completion of the permitted project. Note also that a temporal lag factor is included in the credit calculations to help account for the time lag in functional replacement.

5.11. Maintenance.

Mitigation plans that require perpetual or long-term human intervention will usually not be acceptable. Mitigation areas should be designed to be naturally sustaining following the completion of the mitigation. Care should be taken that hydrology is adequately considered since plans requiring an energy subsidy (pumping, intensive management, etc.) will normally not be acceptable. The goal is to achieve a natural state that does not depend upon maintenance. Proposed mitigation plans that require extensive maintenance will generally be discouraged.

5.12. Consultation.

General Information

To minimize delays and objections during the permit review process, applicants are encouraged to seek the advice of resource and regulatory agencies during the planning and design of mitigation plans. For creation proposals and other complex mitigation projects, such consultation may improve the likelihood of mitigation success and reduce permit-processing time.

6. Variance/Approval. In unusual instances, it may be determined by the Corps that the calculated mitigation is not appropriate (too high or too low) based upon 404(b)(1) Guideline Analysis or Public Interest Review Factors or Threatened and Endangered Species concerns. In the event it is determined that calculated mitigation is inappropriate for the identified adverse impacts, the Corps will consult with relevant agencies and determine an appropriate level of mitigation. The calculated mitigation will still be used as a baseline and rationale for a variance will be documented.

7. Mitigation Banking. Proposals should be in compliance with the Omaha District's "Guidance for Wetland and Stream Mitigation/Banking" document, which can be viewed on the Montana Regulatory Office website at: http://www.nwo.usace.army.mil/html/od-rmt/mthome.htm. Proposals that include use of credits from a mitigation bank must normally comply with the requirements of this SMP as well as any conditions or restrictions applicable to the bank.

8. Stream Mitigation Costs. Costs for mitigation are dependent upon a combination of relatively specific costs for design, construction, monitoring and contingencies, and maintenance. Other less readily definable costs associated with banks and an in-lieu fee program include those for securing real estate instruments (easement, fee title, title search, covenants, enforcement protection, administration, etc.) and overall management of an In-Lieu Fee program. All costs are the responsibility of the applicant. Financial assurances in the form of a bond or other similar binding document may be applied to assure funds will available to complete mitigation via a bank or directly with the applicant.

9. Point of Contact. Copies of this document will be made available on the Montana Regulatory Office website at: http://www.nwo.usace.army.mil/html/od-rmt/mthome.htm Questions regarding use of this policy for specific projects must be addressed to the Project Manager handling the action. Other general inquiries or comments regarding this document may be addressed to:

U. S. Army Corps of Engineers, Omaha District
Attn: Allan Steinle, Regulatory Office, Helena, Montana
10 West 15th Street, Suite 2200 Helena, Montana, 59626
Tel: 406-441-1375 Fax: 406-441-1380

10. Authorizing Signature. By the signature given below, this SMP is authorized for use.

_____
Kathryn Schenk
Chief, Regulatory Branch

COMPENSATORY STREAM MITIGATION – THE PROCESS

11. Mitigation Options. In general, there are four options available to an applicant to implement compensatory stream mitigation. The first option is project specific mitigation designed to compensate for impacts associated with a proposed project. The second option is to buy credits from an established stream mitigation bank. The third option is to pay a calculated fee to an In-Lieu Fee Sponsor. The fourth option is a combination of two or more of the above. The cost of compensatory mitigation will vary according to option selected by the applicant. These are described in more detail as follows.

1. Mitigate With Project: The applicant may elect to prepare their own mitigation proposal or hire a consultant to prepare a mitigation plan and, if approved by the Corps, implement the plan at the expense determined by the applicant's consultant and contractor.
2. Purchase Bank Credits: The applicant may elect to purchase credits from an established stream mitigation bank. In this case, the bank sponsor will determine the cost per credit and total cost for purchasing an appropriate number of credits. The bank and its available credits must be pre-approved by the Corps and the Mitigation Banking Review Team (MBRT).
3. Pay an In-Lieu Fee: The applicant may elect to pay a fee to an In-Lieu Fee (ILF) sponsor. Fees will be calculated based on a per-credit basis. The process described in this Stream Mitigation SMP determines the number of required credits. The In-Lieu Fee Sponsor determines the cost per credit. In general, costs would be based upon those associated with construction and development of previous stream improvement projects completed within Montana, plus an allowance for administrative and management costs. The ILF sponsor assumes responsibility for the mitigation obligation upon acceptance of the negotiated fee. Upon collection of sufficient fees within a given watershed, the ILF sponsor will complete a stream mitigation project that satisfies the assumed mitigation obligation.
4. Combination of above: With Corps' approval, the above options may be combined to satisfy a compensatory mitigation obligation.

12. The Mitigation Equation.

When compensatory mitigation is required, it will be determined through using the following equations. These calculations are not intended to represent an exact or statistically proven scientific method. Rather, the method is based on the judgment of regulatory and resource agency staff. It is intended to establish a clear, understandable, and consistent method for use by applicants and regulators. As additional data is gathered and analyzed, it is possible that the tables of factors will be reviewed and adjusted. When using these equations use the most recent approved edition of the tables.

Simply stated, the mitigation equation requires that for a mitigation proposal to be acceptable, the Proposed Mitigation Credits (PMC) must be equal to or greater than the Mitigation Debits (Debits). T*he portion of the PMC resulting from stream channel restoration, as compared to the riparian buffer, must satisfy at least 25% of the Debits*. The mitigation credits and debits are calculated using the options and factor definitions given in Appendix G, which starts on page 42.

Compensatory Stream Mitigation – The Process

Proposed Mitigation Credits (PMC) ≥ Mitigation Debits (Debits)

And,

$PMC_{Stream\ Restoration} \geq ¼ \times$ Debits

$$PMC = \sum_{i=1}^{n} (M_i \times L_i) \qquad Debits = \sum_{i=1}^{N} (R_i \times LL_i)$$

$$M_i = \sum_{i=1}^{j} m_i \qquad R_i = \sum_{i=1}^{k} r_i$$

PMC = Proposed Mitigation Credits
L_i = The i^{th} linear foot of mitigation
M_i = mitigation multiplier for L_i
m = mitigation factor
n = number of mitigation areas
j = number of mitigation factors

Debits = Mitigation Debits
Ll_i = The i^{th} adverse effects reach
R_i = adverse effect multiplier for Ll_i
r = adverse effect factor
N = number of adverse effect areas
k = number of adverse effect factors

The Debits and PMC are each a summation of products. To calculate each product, one should first evaluate the reaches under consideration and lump similar areas. It is appropriate to lump adverse effects reaches (Ll_i) that involve the same adverse effect factors (r_i). Similarly, it is appropriate to lump mitigation reaches (L_i) that involve the same mitigation factors (m_i). For example, if there are four separate adverse effects reaches but they are all to be permanently filled, are all 1st or 2nd order intermittent streams, all within a tertiary priority category, and all reaches are moderately impaired, then the four reaches can be lumped for purposes of calculating the RMC. Such lumping is just for mathematical simplification and will not effect the resulting calculations. The adverse effects multipliers (R_i) for a reach (Ll_i) are calculated by summing the applicable adverse effect factors (r_i) selected from the attached tables. Similarly, the mitigation multipliers (M_i) for a mitigation reach (L_i) are calculated by summing the applicable mitigation factors (m_i) selected from the attached tables. Each category of mitigation (stream restoration or enhancement by buffering) has a table of factors that are used to compute the credit multipliers for each unique mitigation area. Sample worksheets are provided for documenting and comparing the calculated PMC and the Debits.

13. Factors/Definitions.

The factors used for determination of debits and credits in the following tables are listed and defined in Appendix G starting on page 42 of this document.

14. Mitigation Debit and Credit Tables

Table 14.1. **Adverse Impacts (debit) Factors and Worksheet**

ADVERSE IMPACT FACTORS

FACTORS	OPTIONS								
Stream Type p.42	Ephemeral 0.2		Intermittent 0.3		>2nd Order Perennial 0.6		1st or 2nd Order Perennial 0.8		
Stream Status p.42	Tertiary 0.1			Secondary 0.3			Primary 0.6		
Existing Condition p.43	Impaired 0.1			Somewhat Impaired 0.75			Fully Functional 1.5		
Duration p.43	Temporary (<1yr.) 0.05			Short Term (1-2 yr.) 0.1			Permanent (>2yr.) 0.3		
Dominant Impact p.44	Shade/ Clear 0.05	Utility Crossing 0.15	Culvert 0.3	Armor 0.2 / 0.4	Detent-ion/Weir 0.75	Morpho-logic 1.5	Impound 2.0	Pipe 2.2	Fill 2.5
Collective Impact (length) p.44	0.0005 x total linear feet of stream impacted ($\sum LL_i$)								

<u>Note</u>: The cumulative impact factor for the <u>overall</u> project must be used in each reach column on the Total Debits Worksheet below.

Total Debits Worksheet

Factor	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6
Stream Type						
Stream Status						
Existing Condition						
Duration						
Dominant Impact						
Collective Impact						
Sum of R Factors	R_1 =	R_2 =	R_3 =	R_4 =	R_5 =	R_6 =
Linear Feet Impact	LL_1 =	LL_2 =	LL_3 =	LL_4 =	LL_5 =	LL_6 =
R × LL=						

Total Debits = $\sum$ (R × LL) =

14.2. Riparian Area Credits.

It is recognized that densely vegetated riparian zones are essential to stream system function, channel stability and maintenance of water quality and instream habitat. Credits may be obtained for enhancing buffers by revegetating riparian zones adjacent to the stream. **Note that streams which are recognizably unstable and which require major stream channel or bank restoration are not considered candidate streams for solely buffer enhancement credit.** To qualify for enhancement credit, all buffers and their associated streams and banks must be protected in perpetuity through restrictive covenants, conservation easements or transfer in fee title to a conservation entity. Following the steps below to determine the amount of credits that could be obtained from enhancing riparian areas (buffers).

Step 1: Use the Minimum Riparian Width Table below to determine the minimum width for your proposed or existing land use.

Table 14.2.1: **MINIMUM STREAM RIPARIAN ZONE WIDTHS FOR MITIGATION CREDIT (0-5%SLOPE)**

Land Use	Min. Width (ft)
Single Family Residential	50
Multi-Family Residential	60
Commercial / Golf Course / Agricultural	75
Industrial	100
Landfill	100
Other Categories	Case-by-case

Step 2: Determine minimum width as adjusted for slope utilizing the table below.

Table 14.2.2: **SLOPE* MULTIPLIER TABLE**

Percent Slope Perpendicular to Stream	Multiplier Factor For Minimum and Multiple Widths
Less than 5%	1x
5% - 20%	2x
21%-40%	3x
Greater than 40%	4x

*Slope is measured from top of bank perpendicular away from the stream for a distance of 200 feet. In most instances slope may be averaged for the length of stream to be buffered. However, in situations where stream segments have definitively different slopes it may be appropriate to calculate average slopes for each stream segment.

Step 3: Determine Stream Status of the stream reach to be buffered using definition provided in theDefinition of Factors (Appendix G, page 42).

Step 4: Calculate the Net Improvement Factor for each side of the stream independently utilizing the table below. Definition for "Area to be Restored" is in Appendix G, section 1.2., page 42.

Table 14.2.3: **NET IMPROVEMENT FOR RIPARIAN BUFFERS**

Stream Status Pg. 42	Buffer Width (1 side)	91-100% Area to be Restored	61-90% Area to be Restored	33-60% Area to be Restored	1-32% Area to be Restored	No Restoration Needed*
Primary	4x min. width	1.0	0.9	0.8	0.7	0.6
	3x min. width	0.8	0.7	0.6	0.5	0.4
	2x min. width	0.6	0.55	0.5	0.4	0.3
	Minimum width	0.4	0.3	0.25	0.2	0.15
Secondary	4x min. width	0.95	0.85	0.75	0.65	0.55
	3x min. width	0.75	0.65	0.55	0.45	0.35
	2x min. width	0.55	0.45	0.4	0.35	0.25
	Minimum width	0.3	0.25	0.2	0.15	0.1
Tertiary	4x min. width	0.8	0.7	0.6	0.5	0.4
	3x min. width	0.65	0.6	0.5	0.4	0.3
	2x min. width	0.5	0.45	0.4	0.3	0.2
	Minimum width	0.25	0.2	0.15	0.1	0.05

* **"**No Restoration Needed**"** refers to areas of buffer that have an established riparian corridor or will mature into native riparian area without active restoration. To be eligible for credits, perpetual protection of restored and/or intact, naturally forested riparian zones through restrictive covenants, conservation easements or transfer in fee title to a conservation entity is required.

Note: Credits may not be given for riparian widths deemed excessive to providing benefits to the aquatic system. Credits will not be given for portions of riparian areas that lie outside the drainage area of the buffered stream (e.g., portions of buffers that extend beyond a ridge top into an adjacent drainage area). Should the close proximity of a break in the drainage area (e.g., a ridge top) to the buffered stream preclude attainment of the required minimum buffer width, the Net Improvement may be calculated based on the "Minimum width" for the appropriate Priority Category on the chart above. Buffering both sides of the stream is beneficial. If both sides of the stream are owned or could reasonably be obtained by the applicant, buffering of both sides of the stream is recommended. Streams that are unstable and require major stream channel or bank restoration are not considered candidate streams for solely buffer enhancement credit.

Step 5: Use net improvements previously calculated in Step 4 to insert in the table below. Net improvements should be calculated independently for each side of a single reach of stream. In cases

where only a single side of a reach is buffered, a reach multiplier of 0.75 is used. In cases where both sides of a reach are buffered, a reach multiplier of 1.25 is used.

Table 14.2.4: **RIPARIAN CREDIT FACTORS and WORKSHEET**

Factors	Options					
Net Improvement p.45	Riparian Buffer Enhancement (Calculate Value from above Net Improvement Table) 0.05 - 1.0					
Type of Protection p.45		Permit Cond 0.03	Covenants 0.05	Deed Restrict 0.12	Cons Ease 0.15	Fee Title 0.2
Timing p.45	Schedule 5* 0	Schedule 4 0.02	Schedule 3 0.05	Schedule 2 0.08	Schedule 1 0.1	
Kind p.46	Same Order 0.2	+1 Order 0.1	+2 Orders 0.0			
Location p.46	Onsite 0.2	Offsite 0.1	Outside 0.0			

*Use this option to calculate credits when no restoration of buffer necessary

Factors		Reach 1	Reach 2	Reach 3	Reach 4	Reach 5
Net Improvement	Stream Side A					
Net Improvement	Stream Side B					
Type of Protection						
Mitigation Timing						
Kind						
Location						
Sum of Factors	M =					
Linear Feet	L =					
Reach Multiplier Buffer one side = 0.75 Buffer both sides = 1.25	RM =					
M x L x RM						

Total Riparian Credits = Σ (M x L x RM) = ____

14.3. Stream Restoration Credits.

Stream Channel Restoration. Stream restoration means actions taken to correct previous alterations that have destroyed, diminished, or impaired the character and function of stream systems. Restoration is the process of converting an unstable, altered, or degraded stream corridor to its natural or referenced stable condition, considering recent and future watershed conditions. This process may include restoration of the stream's geomorphic dimension, pattern and profile and/or biological and chemical integrity, including transport of water and sediment produced by the streams' watershed in order to achieve dynamic equilibrium. For those situations where major restoration of appropriate stream dimension, pattern and profile are warranted, credits will reflect the following priority system.

Protection of the restored stream and a minimum 50' wide native vegetated riparian buffers, adjusted for slope utilizing the slope multiplier table through appropriate mechanisms (restrictive covenants, deed restrictions, conservation easements or transfer in fee title to a conservation entity) is required to obtain stream channel restoration credits. Restored/Preserved buffers wider than the 50' minimum will receive higher net improvement scores based on the riparian credit tables in Section 14.2. In unusual circumstances, where the minimal buffer requirement cannot be met for a portion of the restored stream area, the maximum buffer width possible will be protected and the Net Improvement Factor score will be adjusted accordingly on a pro-rated basis.

Stream Relocations. Certain stream relocation projects will also be credited through use of the Stream Restoration table below. This refers to moving a stream to a new location to allow a project authorized under Section 404 of the Clean Water Act to be constructed in the stream's former location. To qualify for mitigation credit, relocated streams should reflect the dimension, pattern and profile of natural, referenced stable conditions and have at least a 50' native riparian buffer from each bank of the stream. Preservation of the relocated stream and buffers through appropriate mechanisms (restrictive covenants, deed restrictions, conservation easements or transfer in fee title to a conservation entity) is required to obtain stream relocation credits. Restored/Preserved buffers wider than the 50' minimum will receive higher net improvement scores based on the riparian credit tables in Section 14.2.

No mitigation credit is generated for relocated streams that do not meet the above criteria, which rely on extensive use of concrete or rock riprap and grade control for stability, or those which do not incorporate natural channel design principles.

Livestock Management. For streams impacted by livestock activities, where a documented problem exists, corrective measures to ensure elimination of the impact and stream recovery will be credited through this table. Actions that may receive mitigation credit include fencing stream corridors, designing controlled livestock access points with stable and protected stream banks, and/or totally eliminating access and providing drinking water from tanks, troughs or other structures located away from the stream corridor.

Highest credits will be given for total exclusion of livestock in areas that are highly impacted. Measures credited for mitigation purposes must be maintained in perpetuity, or as long as there is active livestock use on adjacent lands. Therefore, to receive credit for these actions, restored areas must be protected through appropriate mechanisms (deed restrictions, conservation easements, etc).

Table 14.3.1 **STREAM RESTORATION CREDIT FACTORS and WORKSHEET**

Factors	Options					
Net Improvement p.47	Minimal 1.2		Moderate 1.8		Substantial 2.5	
Stream Status p.42	Tertiary 0.05		Secondary 0.2		Primary 0.3	
Type of Protection p.45		Permit Cond 0.03	Covenants 0.05	Deed Restrict 0.1	Con Ease 0.15	Fee Title 0.2
Timing p.45	Schedule 5 0	Schedule 4 0.02	Schedule 3 0.05	Schedule 2 0.08	Schedule 1 0.1	
Kind p.46	Same Order 0.2		+1 Order 0.1		+2 Orders 0.0	
Location p.46	On-site 0.2		Off-site 0.1		Outside Watershed 0.0	

Stream Restoration Credit Worksheet

Factors		Reach 1	Reach 2	Reach 3	Reach 4	Reach 5
Net Improvement						
Stream Status						
Type of Protection						
Mitigation Timing						
Kind						
Location						
Sum Factors	M =					
Linear Feet	L =					
	M x L =					

Total Stream Restoration Credits = Σ (M x L) =

Table 14.4 **Stream Mitigation Summary Worksheet**

I.	**Required Mitigation**	**Debits**
A.	Total Debits =	

II.	**Non-Banking Credit Summary**	**Credits**	**Linear Feet**
B.	Riparian Buffer Enhancement		
C.	Stream Restoration		
D.	Total Proposed Non-Bank Mitigation = B + C		

III.	**Banking Credit Summary**	**Credits**	**Linear Feet**
E.	Riparian Buffer Enhancement		
F.	Stream Restoration		
G.	Total Proposed Bank Mitigation = E + F		

IV.	**In-Lieu Credit Summary**	**Credits**	**Linear Feet**
H.	Riparian Buffer Enhancement		
I.	Stream Restoration		
J.	Total Proposed In-Lieu Mitigation = H + I		

V.	**Grand Totals**	**Credits**	**Linear Feet**
K.	Total Riparian Enhancement Mitigation = B + E + H		
L.	Total Stream Restoration Mitigation = C + F + I		
M.	Total Proposed Mitigation = D + G + J		

The Total Mitigation Credits (Row M) should be equal to or greater than the total Required Mitigation Credits (Row A) for the proposed mitigation to be acceptable. The other requirements given in the SMP must also be satisfied, e.g., Row L must equal at least 25% of Row A, etc. If the answer to either of the questions below is no, then the proposed mix and/or quantity of mitigation does not comply with the policy and the plan should be revised or rejected, unless a variance is approved.

	Yes	**No**
Proposed Mitigation Credits (PMC) => Debits Or (in words) Are the Credits in M greater than or equal to debits (A)?		
$PMC_{Stream\ Restoration} \geq$ ¼ Debits or (in words) Are the Credits in L greater than or equal to 25% of debits?		

15. Sample Cases/Data Forms

15.1. Sample Case #1: All Mitigation On-Site

Assume that impacts involve permanent fill of 30 linear feet of a somewhat impaired, first order perennial stream in a tertiary priority category for construction of a dam, thus impounding 500 linear feet of this stream. Also, assume this project, a single-family residential development, involves permanent piping of 150 feet of a fully-functional, perennial stream in a tertiary priority category.

Riparian buffer mitigation consists of enhancement of a single side of 2000 feet of Reach 1 and both sides of 1000 feet of Reach 2. The buffers to be enhanced are adjacent to a perennial stream of the same order as the impact stream, are 100 feet in width, have a 6% slope, require 50% of the area to be revegetated (to be performed concurrent with the adverse impacts), are located in a tertiary priority category, and will be protected by deed restrictions overseen by a property owners association.

Stream mitigation includes removing 350 linear feet of culverts on-site and restoring the stream to a "daylighted" condition and establishing appropriate geomorphology based on a referenced, stable channel. The culverted stream to be restored is perennial, in a tertiary priority category, and will be restored prior to the adverse impacts and subsequently protected by deed restrictions overseen by a property owners association. The stream restoration plan was coordinated with appropriate resource and regulatory agencies and deemed acceptable.

DEBITS:

	Area 1 (Dam)	Area 2 (Impoundment)	Area 3 (Piping)
Stream Type	0.8	0.8	0.8
Stream Status	0.1	0.1	0.1
Existing Condition	0.75	0.75	1.5
Duration	0.3	0.3	0.3
Dominant Impact	2.5	2.0	2.2
Collective Impact	0.34	0.34	0.34
R = Sum of Factors	4.79	4.29	5.24
LL = Impact Reach	30	500	150
Product = R x LL	143.7	2145.0	786.0

Total Debits = $\sum$ (R x LL) = 3074.7

MITIGATION CREDITS EARNED:

Minimum buffer width for the mitigation area is calculated by multiplying the minimum width for single-family residential (50 feet) by 2 to account for a 6% slope, yielding a minimum of a 100-foot wide riparian buffer to attain mitigation credit. Thus, the proposed 100-foot buffers satisfy the minimum buffer width.

RIPARIAN BUFFER ENHANCEMENT CREDITS

	REACH 1	REACH 2
Net Improvement Side A	0.15	0.15
Net Improvement Side B	NA	0.15
Location	0.2	0.2
Type of Protection	0.1	0.1
Kind	0.2	0.2
Mitigation Timing	0.05	0.05
M = Sum of Factors	0.7	0.85
L = Linear Feet of Impact	2000	1000
RM = Reach Multiplier	0.75	1.25
M X L X RM	1050	1062.5

Credits = $\sum$(M X L X RM) = 2112.5

STREAM RESTORATION CREDITS

Net Improvement	2.5
Stream Status	0.05
Location	0.2
Type of Protection	0.1
Kind	0.2
Mitigation Timing	0.1
M = Sum of Factors	3.15
L = Linear Feet of Impact	350

Credits = M X L = 1102.5

SUMMARY OF MITIGATION CREDITS

Category	**Credits**
Riparian Buffer Enhancement	2112.5
Stream Restoration	1102.5

Total Credits = 3215.0

PMC ≥ Debits
3215.0 ≥ 3074.7

$PMC_{Stream\ Restoration} \geq ¼$ Debits
1102.5 ≥ 768.7

The Total Proposed Mitigation Credits (3180.0) are greater than the Debits (3074.7) and the credits for stream restoration are greater than ¼ of the Debits. Therefore, the quantity and mix of mitigation is acceptable. The Project Manager must also review the other aspects of the mitigation plan to assure that it is generally in compliance with the policies and guidelines for mitigation.

15.2 Sample Case #2: On-site Mitigation Combined With Mitigation Bank Credits

For this sample case, let us assume that the impacts are the same as in the previous case sample. Thus, we need 3074.7 mitigation credits. Also, assume the same riparian buffer enhancement that generates a total of 2112.5 credits. However, instead of 350 linear feet of stream restoration, assume only 150 linear feet of stream restoration is proposed and the remaining credits will be obtained from a Mitigation Bank. Similar to the previous example we can calculate the following:

Proposed Riparian Buffer Enhancement = 2112.5
Proposed Stream Restoration = 3.15 X 150 = 472.5
Total Proposed Non-Bank Mitigation Credits = 2585.0

The additional credits needed are:

Total Mitigation Credits Required = 3074.7
Total Proposed Non-Bank Credits = 2585.0

Additional Credits Needed = 489.7

We also must consider the requirement that at least ¼ of the required mitigation credits should be from stream restoration. Since a mitigation bank may offer stream restoration or riparian buffer enhancement credits, we need to know the number of stream restoration credits needed.

Stream Restoration Credits Required = ¼ X 3074.7 = 768.7
Proposed Stream Restoration Credits = 472.5

Additional Stream Restoration Credits Needed = 296.2

The applicant then obtains 489.7 credits from a mitigation bank of which at least 296.2 are stream restoration credits. The remaining 193.5 credits may be riparian buffer enhancement credits.

Total Required Debits = 3074.7

II.	**Non-Banking Mitigation**	**Credits**	**Linear Feet**
	Riparian Buffer Enhancement	2112.5	3000
	Stream Restoration	472.5	150
	Total Non-Bank Mitigation	2585.0	3150
III.	**Banking Mitigation**	**Credits**	**Linear Feet**
	Riparian Buffer Enhancement	193.5	calculated by bank
	Stream Restoration	296.2	calculated by bank
	Total Banking Mitigation	489.7	calculated by bank
IV.	**Grand Totals**	**Credits**	**Linear Feet**
	Total Riparian Buffer Enhancement	2306.0	3000 + calculated by bank
	Total Stream Restoration	768.7	150 + calculated by bank
	Total Mitigation	3074.7	3150 + calculated by bank

The Grand Total Proposed Credits are equal to the Debits and the Grand Total Stream Restoration Credits are equal to at least ¼ of the total Debits. Therefore, the proposed mix and types of mitigation satisfy the policy. The number of linear feet required from the bank to obtain these credits will depend on the approved banking documents and must be calculated by the bank operator. The calculation of bank linear feet used should be submitted with both the project mitigation proposal and the regular accounting summary for the Mitigation Bank.

Appendices

Appendix A – Conservation Restrictions

1. *Conservation Restrictions.* All property used for mitigation credits (e.g. all created, restored, enhanced, and preserved sites and buffers) must be protected by suitable conservation restrictions. Depending upon the circumstances, as discussed below, suitable conservation restrictions may include deed restrictive covenants, conservation easement, or transfer in fee title. In some cases, ownership by a suitable conservancy organization or government agency may suffice. Shown below are a few of the typical considerations relevant to this subject.

- In order for covenants or easements to be considered acceptable, they should be in accordance with the most recent edition of the samples maintained by the Corps. The samples are subject to change without notice and will be made readily available at the Corps web site on the Internet. Printed copies may be obtained directly from the Corps upon written request.

- Covenants, easements, and transfers in fee title must be duly executed and recorded with the appropriate local entity responsible for maintaining the public register of real property transactions.

- If protected areas are sold or conveyed to another entity the protected area must be clearly defined in appropriate documents utilized for that transaction. The restrictive covenants option is intended primarily for smaller tracts. In particular, where the relatively small size of the protected area makes it unlikely that a conservancy group would accept an easement, or where the costs involved in establishing easements is not determined to be a reasonable requirement to impose on the permittee. In general, preservation of large tracts should be by means of easement or transfer in fee title to a conservation entity and not covenants. Determinations regarding this issue will be made on a case-by-case basis. By inserting suitable conditions in the permit, the Corps will reserve the right to review the draft language for covenants and easements. Typically, a 30 to 45 day review period will be reserved for this purpose.

- Subdivision of preservation areas into individual lots for residential developments is strongly discouraged. Such subdividing makes enforcement of the preservation agreement burdensome on the government. Experience has shown that subdividing mitigation into lots lowers the likelihood of success for the mitigation. To the maximum extent practicable, preserved areas should be placed in the undivided control of a single owner such as a property owners association, a conservancy organization, or any suitable owner with responsibility for enforcement of the preservation agreement.

- Review the samples available from the Corps for other requirements that may apply. Any exceptions to the general requirements stated here or any changes to the wording of the sample documents must be coordinated with and approved by the Corps' Office of Counsel prior to execution and recording.

2. *Use of Current Models.* Applicants and permittees will be made aware of the model conservation restrictions documents in use at the time. The current model documents will be available for downloading from the Corps website in the future. Regulatory personnel are advised to monitor this site to ensure that model documents provided are current. Models are subject to periodic review and will be updated as necessary. The current model for restrictive covenants for Montana can be found in Appendix B.

3. *Conservation Easements vs. Restrictive Covenants.* For mitigation banks, conservation easements with third-party rights of enforcement or transfer in fee title to a conservation entity will be the protective mechanism; **any exception to this policy must be pre-approved by the Corps of Engineers.** For permitting situations not involving mitigation banks, conservation easements or restrictive covenants, or both, may be used. However, if the applicant does not own the property on which they propose to place conservation restrictions, then a conservation easement will normally be required. In order to "own the property," the applicant must be the same legal entity as the landowner. If the applicant is an individual, and the landowner is a corporation, then

they are not the same. Exceptions allowing the use of restrictive covenants where the applicant does not own the property on which the restrictions are to be placed must be pre-approved by the Corps' Office of Counsel.

4. *Subdivisions.* In the case of a permit for a subdivision, the permit will include a condition that the conservation restrictions are included in the developer's or owner's own general scheme of restrictions for the subdivision. The conservation restrictions to be included in the general scheme should be reviewed by the Corps' Office of Counsel, Omaha District. In some cases, the language of the general scheme of restrictions for the subdivision may be sufficient without additional Corps restrictions, and in such cases the Office of Counsel may determine that the recording of a separate conservation restriction document is unnecessary. All subdivision impacts should be calculated up front and "piecemealing" of potential impacts avoided.

5. *Changes to Model Documents Before Recording.* Changes necessary to customize a model document to a particular applicant, such as the filling in of blanks, determination of whether the State should be a party to the document, and the description of the real property to be protected, may be approved by Regulatory Division personnel. Note well that the property description must be sufficient to enforce the restrictions as intended. **However, any other changes to a model document, including additional exceptions or modifications of standard wording, must be approved by the Office of Counsel prior to execution or recording**, and are subject to approval on a case-by-case basis (for example, exceptions approved in one case may not be suitable for another). **An applicant must clearly identify all proposed changes, including those necessary to customize the model, when the conservation restriction document is submitted for preliminary approval; if all changes are not clearly identified, the document may be returned to the applicant without approval.** When Office of Counsel approval of changes is required, Regulatory Division personnel will compare the proposed conservation restriction document against the model document and ensure that ***all*** changes are identified before submitting for Office of Counsel approval. This Paragraph is subject to periodic review by the Regulatory Division and Office of Counsel to determine whether changes are necessary.

6. *Record of Approval and Recording.* Approval by the Office of Counsel of a conservation restriction document will be indicated by the attorney's initials on the approved version. The approved copy will be part of the official file. In addition, the official file will include the copy thereafter recorded by the applicant. All conservation restriction documents must be recorded and filed prior to either the issuance of the permit or to the transfer of the file from the project manager handling the permit to the clerical staff for filing. All permits requiring conservation restrictions as mitigation will be tracked by entry in the database. The database entry will indicate the geographic location of the conservation restrictions. Standard special conditions will be added to the permit to ensure that are legally recorded in a timely manner. Compliance with these conditions shall be the obligation of the project manager until the condition is satisfied.

7. *Changes to Conservation Restriction Documents After Recording.* "Changes" include amendments, trades, corrections, or any other modifications of a recorded document. Because the conservation restrictions are legal documents, **no change may be processed or agreed to without being pre-approved by the Office of Counsel**. This Office of Counsel approval is separate and apart from any permitting process. Applicants will be informed up front to expect that the restrictions are permanent and that changes should NOT be anticipated; even where provision for changes is made in the recorded document, changes are the exception, not the rule. Applicants desiring any change must submit a copy of the recorded document in question in advance to the project manager and Office of Counsel. The determination of whether and how a change may be made to a recorded conservation restriction will be made by the Office of Counsel based upon the language in the recorded document, applicable policy, and coordination with the Regulatory Division

8. *Enforcement.* The Corps Regulatory staff will promptly notify the Office of Counsel of violations of conservation restrictions of which they become aware. The resolution of all such violations will be coordinated and concurred with by the Office of Counsel.

9. *Database Requirements.* All permits requiring conservation restrictions as mitigation will be tracked by entry in the Corps' database. The database tracking system will include the type of mitigation (e.g. preservation, restoration), the quantity of each type of mitigation, the status of the restrictions (e.g. pending, approved, recorded), and the geographic location (geocode) of the area to be placed under conservation restrictions using either point or polygon data.

Appendices

APPENDIX B
Restrictive Covenants/Model

The statutory authority of the U.S. Army Corps of Engineers includes the issuance of permits under Section 404 of the Clean Water Act (33 U.S.C. 1344), and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). Section 404 covers the discharge of dredged or fill material into wetlands or other waters of the United States. Section 10 prohibits the unauthorized obstruction or alteration of any navigable water of the United States. In some cases, both Sections 404 and 10 will apply.

Prospective permittees under Section 404 may be required to perform what is known as "compensatory mitigation" in return for unavoidable impacts to wetlands or other waters of the United States by the activities or work covered by a permit. A "conservation easement" is used to place permanent "conservation restrictions" on property containing aquatic resources. The conservation restrictions contained in conservation easements significantly limit the property's future use. The easement is conveyed to a third party, or "holder," which is typically a land trust, not-for-profit conservation organization, or governmental entity (the Corps of Engineers will not be a holder). Other alternatives for compensatory stream mitigation include protecting riparian areas through deed restrictions (Declaration of Restrictive Covenants – see example), proponent implemented stream restoration, commercial mitigation banks or in-lieu fee mitigation programs.

Conservation easements may have tax advantages for the landowner. Circumstances will vary, and it is up to the individual landowner to determine the appropriate tax treatment or deductibility. The Corps of Engineers makes no representation whatsoever as to the appropriate tax treatment for a particular conservation easement.

Conservation easements are also used to place conservation restrictions on areas approved as "mitigation banks." A mitigation bank is a site where aquatic resources are restored, enhanced, created and/or preserved for the purpose of providing compensatory mitigation. The bank obtains credits for these activities, which it then offers for sale to prospective permittees.

The purpose of the following model restrictive covenant (deed restriction) is to allow permit applicants to insert specific information into a prepared legal document. Changes necessary to customize the model, such as the identification of parties or real property, or the selection of other italicized provisions, will generally be approved without extended review. Additional changes or alternatives to the model proposed by the permit applicant may result in a more extended regulatory and legal review, and are subject to approval on a case-by-case basis. ANY proposed changes, including those necessary to customize the model, must be clearly identified when the permit applicant submits the proposed restrictive covenant for preliminary approval; if all changes are not clearly identified, the document may be returned to the applicant without approval. ALL restrictive covenants must be approved in writing by the Corps of Engineers before recording.

For explanation of other aspects of these compensatory mitigation alternatives, and of Corps of Engineers permitting in general, please contact the Helena Regulatory Office at10 West 15th Street, Helena, Montana 59626 or call (406) 441-1375.

Appendices

MODEL DEED RESTRICTION:

COVENANT OF DEDICATION

(PERMITTEE) now stipulates to the following statements of fact, and further agrees to restrict the use and title of the realty described in Attachment 1 to this document (hereinafter referred to as the "Land") in accordance with the terms and conditions set forth herein.

STIPULATIONS OF FACT

1. That (PERMITTEE) is the applicant for Department of the Army permit number (NUMBER) to place fill material in the waters of the United States (WUS) located in (LEGAL DESCRIPTION); and that the U.S. Army Corps of Engineers has regulatory jurisdiction over the discharge of dredged or fill material into said waters pursuant to Section 404 of the Clean Water (33 USC 1344).

2. That (PERMITTEE) is the owner in fee of the real estate described in Attach 1.

3. That (PERMITTEE) and the Omaha District of the U.S. Army Corps of Engineers have reached an agreement whereby (PERMITTEE) will be permitted to discharge fill material in WUS in accordance with the terms and conditions of Department of the Army permit number (NUMBER); and that in consideration for said discharge of fill material into WUS, (PERMITTEE) will provide mitigation for the adverse environmental effects resulting from the placement of fill material in WUS by dedicating the realty described in Attachment 1 for perpetual use as a conservancy area in accordance with the terms and conditions of this document and the above-mentioned permit.

4. That the above-mentioned dedication shall consist of the execution of this document by all parties necessary to restrict the use and title of the land; and that this document shall be recorded in the Office of the Register of Deeds for (COUNTY), (STATE).

5. That upon receipt of a certified copy of this document, as recorded in the Office of the County Register of Deeds for (COUNTY), (STATE), the District Engineer of the Omaha District of the U.S. Army Corps of Engineers will issue a validated permit, number (NUMBER) to (PERMITTEE); and that said permit shall be issued in consideration for the execution of this Covenant.

6. That the terms and conditions of this Covenant of Dedication shall, as of the date of execution of this document, bind (PERMITTEE) to the extent of his legal and/or equitable interest in the land; and that this Covenant shall run with the land and be binding on (PERMITTEE) and its successors and assigns forever.

7. That the terms and conditions of this Covenant shall be both implicitly and explicitly included in any transfer, conveyance, or encumbrance of the Land or any part thereof, and that any instrument of transfer, conveyance, or encumbrance affecting all or any part of the Land shall set forth the terms and conditions of this document either by reference to this document or set forth in full text.

Appendices

DEED AND USE RESTRICTIONS

(PERMITTEE) hereby warrants that he is the owner in fee of the realty described in Attachment 1; and that the Land is hereby dedicated in perpetuity for use as a conservancy area.

(PERMITTEE) hereby agrees to restrict the use and title of the Land as follows:

1. There shall be no construction or placement of buildings or mobile homes, fences, signs, billboards or other advertising material, or other structures, whether temporary or permanent, on the land.

2. There shall be no filling, draining, excavating, dredging, mining, drilling or removal of topsoil, loam, peat, sand, gravel, rock, minerals or other materials.

3. There shall be no building of roads or paths for vehicular travel or any change in the topography of the land. Wooden boardwalks for pedestrians are permitted.

4. There shall be no removal, destruction, or cutting of trees or plants, spraying with biocides, insecticides, or pesticides, grazing of animals, farming, tilling of soil, or other agricultural activity.

5. There shall be no operation of snowmobiles, dune buggies, motorcycles, all-terrain vehicles or any other type of motorized vehicle on the land.

6. This Covenant of Dedication may be changed, modified or revoked only upon written approval of the District Engineer of the Omaha District of the U.S. Army Corps of Engineers. To be effective, such approval must be witnessed, authenticated, and recorded pursuant to the law of the State of (STATE).

7. This Covenant is made in perpetuity such that the present owner and its heirs and assigns forever shall be bound by the terms and conditions set forth herein.

8. It is expressly understood and agreed that these restrictive covenants do not grant or convey to members of the public any rights of ownership, entry or use of the Property. These restrictive covenants are created solely for the protection of the Property, and for the consideration and values set forth above, the PERMITTEE(S) reserve*(s)* the ownership of the fee simple estate and all rights appertaining thereto, including without limitation the rights to exclude others and to use the property for all purposes not inconsistent with these restrictive covenants.

9. The Corps and *its/their* authorized agents shall have the right to enter and go upon the lands of the permittee to inspect the Property and take actions necessary to verify compliance with these restrictive covenants.

10. The Permittee grant*(s)* to the Corps, the U.S. Department of Justice, a discretionary right to enforce these restrictive covenants in a judicial action against any person*(s)* or other entity (ies) violating or attempting to violate these restrictive covenants; provided, however, that no violation of these restrictive covenants shall result in a forfeiture or reversion of title. In any enforcement action, an enforcing agency shall be entitled to a complete restoration for any violation, as well as any other judicial remedy such as civil penalties. Nothing herein shall limit the right of the Corps to modify, suspend, or revoke the Permit.

By:
(PERMITTEE)

Executed before me this ____ day of _____, 20_, by (PERMITTEE) who is personally known to me.

_____ My commission expires_____
Notary Public

NOTARY PUBLIC FOR MONTANA
My Commission Expires:

Appendix C
Glossary and References

Adverse effects as used in this SMP means any adverse ecological effect on Waters of the United States including all filling, excavating, flooding, draining, clearing, or similar changes impacting U. S. Waters. Other categories of effects such as aesthetic, cultural, historic, health, etc., are not addressed by this SMP. See also the definition of "effects" in this glossary.

Aquatic site means any Water of the United States, including special aquatic sites such as wetlands.

Bankfull Discharge is the discharge that is most effective at moving sediment, forming or removing bars, forming or changing bends and meanders, and doing work that results in the average morphologic characteristics of channels. The bankfull stage is the point at which water begins to overflow onto a floodplain and is commonly referred to as the discharge with a frequency of occurrence of between 1.5-1.7 years. Bankfull may not be at the top of the stream bank in incised or entrenched stream (Dunne and Leopold, 1978).

Braided stream system means a multiple-thread channel system with a very low stream gradient (<.005) and individual channels with highly variable bank full width. These streams have extensive, well-vegetated floodplains and associated wetlands (Rosgen, D.A. (1996) Applied River Morphology).

Buffer zone means an area designed to separate. A vegetated upland or wetland area next to rivers, streams, lakes or other open waters that separates the open water from developed areas, including agricultural lands. The existing buffer can be preserved as is or enhanced for additional credits.

Channel Features as found in natural streams are sequences of riffles and pools or steps and pools that maintain channel slope and stability and provide diverse aquatic habitat.

> *Riffles* are bed features with gravel or larger size particles where the water depth is relatively shallow and the slope is steeper than the average slope of the channel. At low flows, water moves faster over riffles, which provides oxygen to the stream. Riffles are found entering and exiting meanders and control the streambed elevation because of a concentration of the larger rock found naturally in an alluvial channel.
>
> *Pools* are located on the outside bends of meanders between riffles. The pool has a flat slope and is much deeper than the average depth of the stream. Deep pools are found at the bottom of each step.
>
> *Steps* are vertical drops often formed by large boulders or downed trees. Deep pools are found at the bottom of each step. Step/pool sequences are found in higher gradient streams.

Compensatory mitigation: For the purposes of Section 10/404, compensatory mitigation is the restoration, creation (establishment), enhancement or in exceptional circumstances, preservation (protection/maintenance) of wetland and/or other aquatic resources for the purpose of compensating for unavoidable adverse impacts that remain after all appropriate and practicable avoidance and minimization has been achieved. Compensatory Mitigation for aquatic areas addressed by this SMP includes:

> *Creation* means the conversion of non-aquatic habitat to aquatic habitat. Creation usually includes grading; establishment of appropriate pattern, dimension and profile; providing suitable substrate, hydrology, and establishment of native vegetation.
>
> *Enhancement* means increasing or improving one or more of the functions or values of an existing aquatic area.
>
> *Preservation* means the protection of an area to prevent its destruction or degradation.

Restoration means actions taken to correct previous alterations that have either destroyed or seriously impaired the character and functions of an aquatic area. An example is hydrological restoration followed by planting of appropriate wetland vegetation in a bottomland hardwood area that had previously been converted to a non-aquatic site.

DE stands for District Engineer.

Council on Environmental Quality (CEQ) has defined at 40 CFR Part 1508.8 that the words *impacts* and *effects* are synonymous and that *effects* includes ecological, aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Further, the CEQ stated that *effects* include:

- Direct effects, which are caused by the action and occur at the same time and place.
- Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.
- Cumulative effects which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions.

Entrenchment Ratio is an index value used to describe the degree of vertical containment of a river channel. It is the ratio of the width of the flood-prone area to the surface width of the bankfull channel. The flood-prone area width is measured at the elevation that corresponds to twice the maximum depth of the bankfull channel as taken from the established bankfull stage (Rosgen, D.A. (1996) Applied River Morphology).

Ephemeral streams include those streams that flow only in direct response to rainfall or snowmelt and whose bed is above the groundwater table at all times. To be jurisdictional under Section 404, an ephemeral stream will need to have a defined bed and bank (ordinary high water mark) as compared to a vegetated "swale" or low feature on the landscape that may itself periodically transport surface waters. These stream courses are usually located in the uppermost, headwater portions of a watershed.

Flood-prone Area Width is the width of the flood-prone area as measured in the field at an elevation twice-maximum depth at bankfull. Maximum depth is the difference between the bankfull stage and thalweg elevations in a riffle section (Rosgen, D.A. (1996) Applied River Morphology) .

Intermittent streams are streams that have a defined bed and bank and do not flow continuously all year round, but beyond periods of rainfall and with greater frequency than similarly located ephemeral streams. Their streambed is located in a zone of groundwater fluctuation, thus the stream may gain water from or lose water to groundwater. For this SMP, intermittent streams also include those reaches of a stream that lack surface flows, even though there is perennial surface flow both up and downstream.

Mean Depth at Bankfull is the mean depth of the stream channel cross-section at bankfull stage as measured in a riffle section.

MBRT stands for Mitigation Bank Review Team. An interagency group designated to review and consult with proponents regarding Compensatory Mitigation Bank proposals.

Mitigate as defined by the Council on Environmental Quality has defined at 40 CFR Part 1508.20 that *mitigation* includes:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the effected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

- Compensating for the impact by replacing or providing substitute resources or environments.

MOA stands for Memorandum of Agreement.

NTIS stands for National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. 703-487-4650 or 487-4780.

NWP stands for US Army Corps of Engineers Nationwide Permit.

Perennial streams are streams that flow most of the year in a channel with a defined bed and bank and whose channel bed remains below the groundwater table at all times of the year. A perennial stream, or reaches thereof, will go dry only during prolonged periods of drought.

Riverine, as used in this SMP, means rivers, streams, and similar natural flowing water bodies together with their associated adjacent wetlands and riparian zones.

Sinuosity of a stream is defined as the ratio of channel length/valley length. In addition to slope, the degree of sinuosity is related to channel dimensions, sediment load, stream flow, and the bed and bank materials.

Special aquatic sites means wetlands, mud flats, vegetated shallows, coral reefs, riffle and pool complexes, sanctuaries, and refuges as defined at 40 CFR 230.40 thru 230.45.

Stable Stream is one that maintains its dimension, pattern, and profile over time such that the stream does not degrade or aggrade. Naturally stable streams must be able to transport the sediment load supplied by the watershed. Instability occurs when scouring causes the channel to incise (degrade) or when excessive deposition causes the channel bed to rise (aggrade) (Dunn and Leopold, 1978).

Stream Order refers to a systematic process for describing the degree of branching of a stream network within a watershed. The order of any stream segment is determined by starting at the headwaters and labeling each unbranched tributary as order one (first order stream). Where two first-order streams come together, a second-order stream is designated. When two second-order streams merge, a third-order stream is created. The junction of any two streams of equal order results in a stream of the next higher order.

Stream Pattern describes the view of a stream channel as seen from above. Streams are rarely straight; they tend to follow a sinuous path across a floodplain.

Stream Profile refers to the longitudinal slope of the stream. At the watershed scale, channel slope generally decreases in the downstream direction with commensurate increases in stream flow and decreases in sediment size. Channel slope is inversely related to sinuosity, so steep streams have low sinuosities and flat streams have high sinuosities.

Stream Type as used in this document refers to the "Rosgen Stream Classification System" (Rosgen, D.A. (1996) Applied River Morphology), which categorizes streams based on channel morphology so that consistent, reproducible and quantitative descriptions can be made.

Thalweg is a line connecting the lowest or deepest points along a streambed channel.

Threshold means the level, point, or value above which something is true or will take place and below which it is not true or will not take place. For the purposes of this SMP, the thresholds given herein are considered to be the level of adverse impacts caused by the proposed project above which the project fails to meet the conditions, limitations, restrictions, or other requirements specified in relevant laws or regulations.

Width/Depth Ratio is an index value that indicates the shape of the channel cross-section. It is the ratio of the bankfull width divided by the mean depth at a bankfull discharge.

References:

Dunne, T. and L.B. Leopold. 1978. Water in Environmental Planning. W.H. Freeman and Col, San Francisco, CA. 818 pp.

Rosgen, D.L. 1996. Applied River Morphology. Wildland Hydrology Books, Pagosa Springs, Colorado.

The Federal Interagency Stream Restoration Working Group. 1998. Stream Corridor Restoration; Principles, Processes, and Practices. National Technical Information Service, Springfield, Virginia.

United States Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 1996. Stream bank and shoreline protection. In Engineering field handbook, Part 650, Chapter 16.

Appendices

Appendix D
Rosgen Field Form and Stream Classification Table

The following two documents are forms from Rosgen that should be used to obtain and document field data for a reference stream reach, stream that may be adversely impacted by an applicant's proposed project and/or stream proposed for mitigation. The stream classification table should be referenced for classifying any of these streams.

22. Data Forms

22.1. *Stream Channel Classification and Reference Reach Data Forms*

Stream Channel Classification

Stream NAME: ______________________

Basin NAME: ____________ Drainage AREA: ______ Ac. ______ SqMi.

Location: ______________________

Twp: ______ Rge: ______ Sec: ______ Qtr: ______ Lat. ______ Long. ______

Observers: ______________ Date:

Bankfull WIDTH (W_{bkf}) ____________ Ft.
WIDTH of the stream channel, at bankfull stage elevation, in a riffle section.

Mean DEPTH (d_{bkf}) ____________ Ft.
Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section. ($d_{bkf} = A / W_{bkf}$)

Bnkfl. X-Section AREA (A_{bkf}) ____________ Sq.Ft.
AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.

Width / Depth RATIO (W_{bkf} / d_{bkf}) ____________
Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.

Maximum DEPTH (d_{mbkf}) ____________ Ft.
Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and thalweg elevations, in a riffle section.

WIDTH of Flood-Prone Area (W_{fpa}) ____________ Ft.
Twice maximum DEPTH, or ($2 \times d_{mbkf}$) = the stage/elevation at which flood-prone area WIDTH is determined. (riffle section)

Entrenchment Ratio (ER) ____________
The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH. (W_{fpa} / W_{bkf}) (riffle section)

Channel Materials (Particle Size Index) D50 ____________ mm.
The D50 particle size index represents the mean diameter of channel materials, as sampled from the channel surface, between the bankfull stage and thalweg elevations.

Water Surface SLOPE (S) ____________ Ft./Ft.
Channel slope = "rise" over "run" for a reach approximately 20 - 30 bankfull channel widths in length, with the "riffle to riffle" water surface slope representing the gradient at bankfull stage.

Channel SINUOSITY (K) ____________
Sinuosity is an index of channel pattern, determined from a ratio of stream length divided by valley length (SL/ VL); or estimated from a ratio of valley slope divided by channel slope (VS/S)

Stream Type ______ For reference, note: Item 22.2 (Classification Key)

REFERENCE REACH Summary Data

Channel DIMENSION

Pool Depth (dp) Ft.	Pool Width (Wp) Ft.	Pool(xs)Area: (Ap) SqFt.
Riffle Depth (dr) Ft.	Riffle Width (Wr) Ft.	Riffle(xs)Area: (Ar) SqFt.

- Ratio: POOL Depth / RIFFLE Depth: (dp / dr)
- Ratio: POOL Width / RIFFLE Width: (Wp / Wr)
- Ratio: POOL Area / RIFFLE Area: (Ap / Ar)
- Ratio: Max. Pool Depth / Mean Bankfull Depth (d_{bkf}): (dp_{max} / d_{bkf})
- Ratio: Lowest Bank Height / Max. Bankfull Depth (d_{mbkf}): (BH_{low} / d_{mbkf})
- Streamflow: Estimated Mean Velocity (u) @ Bankfull Stage Ft./Sec.
- Streamflow: Estimated Discharge (Q) @ Bankfull Stage CFS

Channel PATTERN

Meander Length (L_M) Ft.	Radius of Curvature (R_C) Ft.
Belt Width (W_{BLT}) Ft.	Meander Width RATIO(MWR = W_{BLT} / W_{BKF}):

- RATIO: Radius of Curvature / Bankfull Width (R_C / W_{BKF})
- RATIO: Meander Length / Bankfull Width (L_M / W_{BKF})

Channel PROFILE

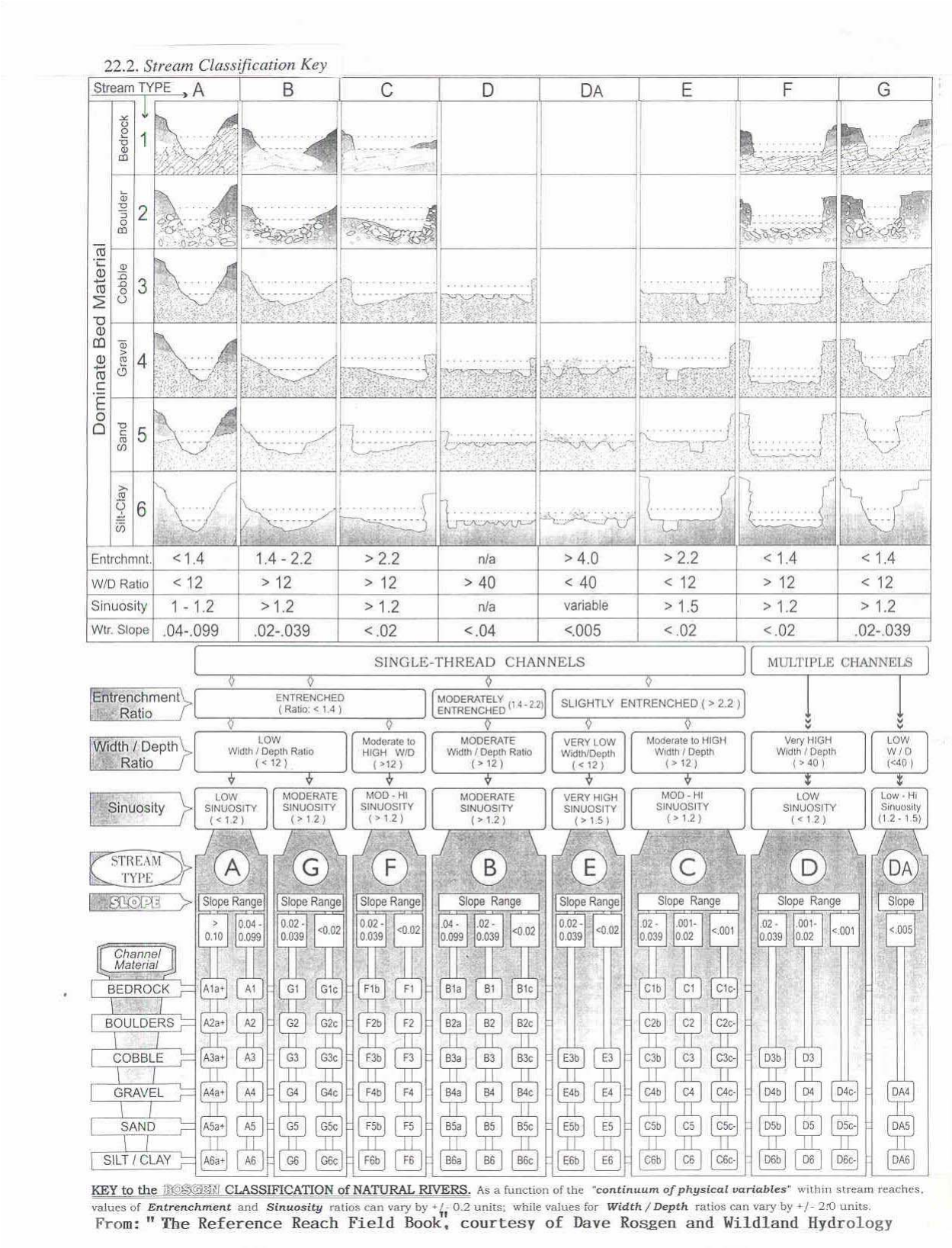
Valley Slope Ft./Ft.	Ave. Water Surface Slope Ft./Ft.
Riffle Slope Ft./Ft.	Pool Slope Ft./Ft.
Pool to Pool Spacing Ft.	Pool Length Ft./Ft.

- RATIO: Riffle Slope / Average Water Surface Slope
- RATIO: Pool Slope / Average Water Surface Slope
- RATIO: Run Slope / Average Water Surface Slope
- RATIO: Glide Slope / Average Water Surface Slope
- RATIO: Run Depth / Mean Depth-Bankfull
- RATIO: Glide Depth / Mean Depth - Bankfull
- RATIO: Pool Length / Bankfull Width
- RATIO: Pool to Pool Spacing / Bankfull Width

Channel MATERIALS

% Sand & <	D16 mm
% Gravel	D35 mm
% Cobble	D50 mm
% Boulder	D84 mm
% Bedrock	D95 mm

From: "The Reference Reach Field Book", courtesy of Dave Rosgen and Wildland Hydrology



KEY to the ROSGEN CLASSIFICATION of NATURAL RIVERS. As a function of the *"continuum of physical variables"* within stream reaches, values of ***Entrenchment*** and ***Sinuosity*** ratios can vary by +/- 0.2 units; while values for ***Width / Depth*** ratios can vary by +/- 2.0 units.

From: "The Reference Reach Field Book", courtesy of Dave Rosgen and Wildland Hydrology

App

Appendices

Appendix E
Projects Not Requiring Mitigation

Exemptions:
Corps of Engineer regulations at 33 CFR Parts 320-330, January 12, 1987, part 323.4 identifies discharges not requiring permits. It specifically states that any discharge of dredged or fill material that may result from any of the following activities is not prohibited by or otherwise subject to regulation under section 404. These exemptions are listed as follows.

(a) Normal farming, silviculture and ranching activities such as plowing, seeding, cultivating, minor drainage, and harvesting for the production of food, fiber, and forest products, or upland soil and water conservation practices, as defined in paragraph (a)(2)(iii) of this section.
(b) Maintenance, including emergency reconstruction of recently damaged parts, of currently serviceable structures such as dikes, dams, levees, groins, rip rap, breakwaters, causeways, bridge abutments or approaches, and transportation structures. Maintenance does not include any modification that changes the character, scope, or size of the original fill design.
(c) Construction or maintenance of farm or stock ponds or irrigation ditches, or the maintenance (but not construction) of drainage ditches, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches are included in this exemption.
(d) Construction of temporary sedimentation basins on a construction site which does not include placement of fill materials into waters of the U.S.
(e) Any activity with respect to which a state has an approved program under section 208(b)(4) of the CWA, which meets the requirements of sections 208(b) (4) (B), and (C).
(f) Construction or maintenance of farm roads, forest roads, or temporary roads for moving mining equipment, where such roads are constructed and maintained in accordance with best management practices (BMP's) to assure that flow and circulation patterns and chemical and biological characteristics of waters of the U.S. are not impaired, that the reach of the waters of the U.S. is not reduced, and that any adverse effect on the aquatic environment will be otherwise minimized.

Other Types:
Other types of applicant-sponsored projects that would be located in a stream **may not** require mitigation because of the potential for minimal or no adverse impact to the aquatic environment. Examples of projects that may not require mitigation include the following.

1. Aids to Navigation. The placement of aids to navigation, mooring buoys, temporary recreational structures and regulatory markers which are approved by and installed in accordance with the requirements of the U.S. Coast Guard.
2. Structures in Artificial Canals. Structures constructed in artificial canals within primarily residential developments where the connection of the canal to a navigable water of the U.S. has been previously authorized.
3. Maintenance. The repair, rehabilitation, or replacement of any previously authorized, currently serviceable, structure, or fill, or of any currently serviceable structure of fill authorized by 33 CFR 330.3, provided the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit and cumulative adverse impacts are minimal.
4. Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities. Fish and wildlife harvesting devices and activities such as pound nets, duck blinds, small fish attraction devices, fish screens, fish ladders and similar structures and devices whose use is to manage fish and/or wildlife resources at the recommendation and support of the Montana Fish, Wildlife and Parks Department.
5. Scientific Measuring Devices. Devices whose purpose is to measure and record scientific data such as staff gages, water recording devices, water quality testing and improvement devices and similar structures.

6. Survey Activities. Survey activities including core sampling, seismic exploratory operations, plugging of seismic shot holes and other exploratory-type bore holes, soil survey and sampling, and historic resources surveys. Note: does not include discharges associate with test wells for oil and gas exploration.
7. Utility Line Discharges. Utility lines include outfall and intake structures, or any pipe or pipeline for the transportation of any gaseous, liquid, liquefiable, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, and telegraph messages, and radio and television communication. Activities that result in a discharge of dredged or fill material into a stream, including backfill, are regulated, however, if the work is done when flow is absent in ephemeral or intermittent channels, mitigation beyond necessary bank reclamation will generally not be required. Mitigation will not usually be required for operations utilizing a cable plow. Original contours and substrate should be re-established and replaced.
8. Bank Stabilization. Bank stabilization usually requires the placement of fill materials below the ordinary high water mark of a stream, therefore, the activity is regulated. Bank stabilization that includes only sloping and revegetating the bank typically does not require a 404 permit since there is not a discharge of fill material. Bank stabilization by bank sloping and revegetating that require a rock toe to anchor erosion control mediums will not normally need compensatory mitigation if local stream source rock is used. Projects of 150 feet or less in length will normally not require migration. This is a cumulative length, which includes existing bank stabilization up or downstream on the same bank. Bank stabilization directly across the channel from existing bank stabilization will require compensatory mitigation (except for minimal stabilization associated with utility and transportation projects, as defined in "g" and "i" of this appendix). Compensatory mitigation may not be required for projects addressing anthropogenically accelerated stream bank erosion beyond the applicant's control. Bank stabilization on lacustrine systems will not normally require compensatory mitigation.
9. Linear Transportation Crossings. Road crossings that completely span the ordinary high water channel (including abutment fills and riprap) and are not located in wetlands do not require 404 authorization. Projects that clear span the ordinary high water channel (including abutments) and do not involve more than 150 feet of riprap or other fills (combined for both banks), will not normally require compensatory mitigation. Culverts less than 100 feet long on ephemeral channels, and culverts less than 50 feet long on intermittent and perennial channels will not typically require mitigation.
10. Minor Discharges. Minor discharges (less than 25 cubic yards) of dredged or fill materials, that do not result in the direct or indirect loss of more than 1/10 acre of wetland, pool and riffle complex or other special aquatic site will normally not require mitigation.
11. Minor Dredging. Dredging of no more than 25 cubic yards of material from below the plane of the ordinary high water mark/bank full will not require mitigation.
12. Stream Restoration Activities. Projects designed to improve the physical, chemical or biological characteristics of a stream will not require mitigation. Such projects will be evaluated on a case-by-case basis. Project proposals must include documentation that supports the need for restoration activities and describes how the proposed strategies will achieve restoration goals.
13. Boat Ramps. Construction of boat ramps in streams may not require mitigation provided the ramp is not located in a wetland. Rip rap cannot exceed limits described in "h" of this appendix.

Appendices

Appendix F
Data Requirements – baseline/monitoring/success criteria, contingency

1. *Baseline.* The following information may be required from an applicant for consideration of a mitigation proposal. The baseline information pertains primarily to the conditions of the site proposed for development by an applicant as compared to the baseline conditions for the site selected for mitigation. Applicants are encouraged to provide more than one copy of a proposal to expedite agency notification. Proposals will be reviewed and the applicant will be advised if additional information is required to make the proposal adequate for consideration. Other information may be needed as part of the General Permit Notification process or Individual Permit process.
2. *Monitoring and Contingency.* The applicant will be required to monitor the mitigation area for success and to provide written reports describing the findings of the monitoring efforts. Because of the many variables involved, no specific standards are set forth. Instead, a monitoring plan should be submitted as a part of the mitigation proposal for review. Monitoring efforts usually include periodic reviews in the first years, as needed, and potentially annually thereafter for a determined number of years, on a project-by-project basis. The plan should include contingency measures specifying remediation actions that will be followed should the success criteria or scheduled performance criteria not be fully satisfied. Monitoring and contingency plans and reports could include any of the following items or additional data, on a case-by-case basis.

   - Scaled plans, including cross sections, longitudinal profiles, plan-view channel dimensions and aerial photos.
   - Names, addresses, and phone numbers for all parties responsible for mitigation and monitoring.
   - A description of the existing vegetative communities to be affected by the proposed mitigation, with wetland delineation and identification of pool and riffle complexes, if applicable.
   - A narrative discussion of the key elements of the proposed project and mitigation plan.
   - A schedule showing earliest start and latest completion dates for all significant activities.
   - A listing and definition of measurable mitigation success factors with quantifiable criteria for determining success.
   - Description of the equipment, materials, and methods to be used.
   - Identification and descriptions of reference stream reaches.
   - Hydrologic monitoring on the applicant's project reach and proposed mitigation reach.
   - Photographic documentation of the impacted stream and mitigation reach.
   - Bond or other contingency measures to be initiated to assure successful mitigation.
   - Measures planned to provide long-term legal protection of the mitigation resource.
   - Monitoring of the physical, biological and/or chemical characteristics of the adversely impacted and/or the mitigation site to assess the recovery of resources and functions.

3. *Stream Monitoring*. Monitoring is generally conducted to determine whether the enhancement/restoration has accomplished the desired effect on the ecosystem. Both physical and biological monitoring may be required for major restoration projects. **For most restoration projects, both pre (baseline) and post construction surveys may be required.** Monitoring should include a reference reach that would act as control data. Reference reach data collected for the restoration design may also be used as the reference for monitoring success. The reference reach is generally a stream of the same stream type (Rosgen, 1996), similar size, located in the same ecoregion and preferably the same or neighboring watersheds, and that is stable and relatively undisturbed. In some cases, the reference reach could be located on the same stream either above or below the impacted area being restored. Monitoring should be conducted annually on a case-by-case basis after completion of the enhancement/restoration activity and may be required for several years. It is likely that monitoring after at least one bankfull event will be required. Monitoring requirements for projects will be tailored to the size of the project and may include both physical and biological elements on a case-by-case basis. Methods for stream restoration monitoring are described in Rosgen, 1996 and The Federal Stream Restoration Working Group, 1998.
4. *Physical Monitoring*. The types of measurements and monitoring that will typically may be required include, but are not limited to, flow characteristics, channel cross-sections, longitudinal profiles, substrate and sediment

characteristics, other morphological characteristics (dimension, pattern and profile), channel stability (vertical and lateral), water temperature, dissolved oxygen, and turbidity. It is important that selected monitoring variables are sensitive enough to show change and can be measured. Data sheets for determining stream type and dimension, pattern and profile are included in Appendix C. Other physical parameters that should be monitored include frequency and diversity of pool and riffle complexes, spawning substrates, undercut banks, and large woody debris within the stream channel.

5. *Biological Monitoring*. Biological surveys are useful tools in determining the success of a restoration project. Biological surveys of stream fauna such as fish and macro-invertebrates should be used on projects that target, either directly or indirectly, in-stream habitat restoration. One acceptable method for biological monitoring in streams is the index of biological integrity (IBI). Biological surveys of flora should be made when buffers are being enhanced and when bioengineering techniques are being used for bank stabilization. Vegetation monitoring, which will be required for most riparian restoration and bioengineered bank stabilization projects, includes measurement of vegetation survival and growth (density, height, diameter at breast height, or other biomass measure). Biological monitoring may also include counting numbers of redds, conducting fish surveys (visual and/or electrofishing), or conducting macroinvertebrate studies.
6. *Success Criteria*. Success criteria will be used to determine the effectiveness of achieving restoration goals on a given project. Success criteria should be established that specifically address the goals of a given restoration project. **It is critical that success criteria selected for various monitoring measures are appropriate for demonstrating attainment of projected restoration goals.** For stream systems, this may entail bringing an actively aggrading or degrading system into a state of dynamic equilibrium whereby the monitoring data will indicate stream channel stability and improved biological integrity. Success Criteria and restoration goals should be identified early in the process and the Corps should concur prior to doing the mitigation project. The final amount of credit awarded is based on monitoring results, not predicted credits.
7. *Drawings.* Mitigation plans should include drawings in conformance with the following.
   Drawings must be on 8.5 x 11 inch paper. Drawings must be clear, readable, and reproducible on standard, non-color office copiers. For large or complex projects, plans should also be submitted on paper sized no smaller than 11 x 17 inch and no greater than 30 x 42 inch. Each drawing sheet should include:

   - an unused margin of no less than ¼ inch;
   - title block with applicant's name, project title, site location, drawing date, application or file number, and sheet number;
   - all significant dimensions clearly indicated and annotated;
   - a directional arrow indicating north;
   - an appropriate graphic scale (when reasonable);
   - a clear, legible plan view indicating area sizes and length (e.g. square feet, acres, linear feet) for all mitigation sites.
   - Legal description (section, township, range)

8. Location maps for the proposed activity must be included. Two maps are desired. A County road map and a US Geological Quadrangle map are preferred as sources. The location maps must show roads leading to the site and must include the name or number of these roads. Each map must include a title block. Identification of the project's latitude and longitude is desired.

9. Plan views of the proposed mitigation must be included. These drawings must show the general and specific site location and character of all proposed activities, including the relationship of all proposed work to Waters of the United States in the vicinity of the project.

10. For ground disturbing mitigation work, cross section views must be submitted depicting the existing ground contours and the proposed finished contours. All aquatic areas within the project boundaries (avoided, impacted, or mitigated) must be shown. Mitigation areas must be shown (enhancements, creations, restorations, etc.).A legend must be shown identifying cross-hatching, shading, or other marking techniques used.

11. A summary table with the quantity of each category of impacted area and each category of mitigation must be shown.

12. Show the ordinary high water line (bankfull) of affected and adjacent open surface water bodies.

13. Show the base flow and flood prone area of the affected stream.

14. If the plan involves dredging in Federal navigable waters (Missouri River, Yellowstone River from Emigrant downstream or the Kootenai River from Jennings upstream) the drawings must include:

- The method of dredging;
- The site and plans for disposal of the dredged material;
- A description of the type, composition and quantity of the material to be dredged.

15. If the plan includes discharge of dredged or fill material into Waters of the United States or transportation of dredged material, the drawings must include:

- The source of the material;
- A description of the type, composition and quantity of the material;
- The method of transportation and disposal of the material;
- The location of the disposal site.

16. For large or complex mitigation projects involving creation, restoration, enhancement (other than by buffering), or a combination thereof, topographic drawings showing the contours and elevations of the completed mitigation area may be required. The drawings should show types of plantings, locations of plantings, and all other structures and work that are a significant part of the mitigation.

17. Distribution-Projects Requiring an Individual Permit. Generally, proposals with bound or voluminous information will not be distributed via public notice mailings in order to minimize reproduction and mailing costs. For projects with proposals that are fully shown on a few pages, the Corps Project Manager may include the proposal with the public notice for the permit application. When the proposal is distributed via public notice it must be clearly labeled as the mitigation proposal. One complete original along with at least one copy of the proposal should be submitted when it is to be distributed via the public notice. Applicant may be requested to provide a sufficient number of copies (usually eight) for reviewing agencies if the proposal includes material that is bound, voluminous, on paper larger than 8.5 x 11 inch size, not reproducible in black and white, or which for other reasons cannot readily be distributed by means of the regular public notice mailing.

Appendices

Appendix G
Factor Definitions

1. Definition of Factors Used in Tables and Worksheets.

1.1 Adverse Impact Factors

Stream Type. For purposes of this SMP, three major categories of streams are defined (ephemeral, intermittent, perennial) and stream orders are defined for perennial streams.

Ephemeral streams are those that have a defined channel (bed and bank) but only have a discharge during or after a precipitation event. Flow is not sustained by groundwater at any time of year. The flow consists wholly of runoff from recent precipitation or snowmelt events and flow for only a short time afterwards. The bed of the stream is above the water table at all seasons.

Intermittent streams have a defined channel that does not flow year round, but does have a discharge beyond periods of precipitation. The stream flows steadily when the water table is above the level of the streambed but it becomes a losing stream in the dry season, when the water table sinks below the streambed. For the purposes of this SMP, an intermittent stream includes that portion of a perennial stream that goes underground through a reach where there is a large mass of alluvial material and resurfaces again downstream within a defined channel.

Perennial streams have a defined channel that flows all year except perhaps during periods of prolonged drought. The water table remains above the level of the streambed and may be the only source of water for the stream when there is no precipitation or surface runoff.

Stream Status. These are stream and riverine systems (including associated tributaries) that provide functions of recognized importance. They may be systems that also have a high social, cultural, or economic value component.

Primary Waters: These areas provide important contributions to biodiversity on an ecosystem scale or high levels of function contributing to landscape or human values. Impacts to these areas should be rigorously avoided or minimized. Compensation for impacts in these areas should emphasize replacement nearby and in the same immediate 8-digit watershed. Designated primary Priority Categories include:

- Waters receiving designation under the Wild and Scenic Rivers Act
  http://fwp.state.mt.us/insidefwp/fwplibrary/gis/imagefiles/wildscenic.jpg
- Waters fully supporting all beneficial uses: Water Quality Category 1 and 2. See MT DEQ's 2004 Integrated Water Quality Report.
  http://www.nris.state.mt.us/wis/environet/databasechoice2.html. Go to: Montana's Water Quality Asessment Data Base: County: Stream/Lake: Full Report
- Waters with outstanding Fisheries Resource Value as reported on the Montana Fisheries Information System
  http://www.nris.state.mt.us/interactive.html Go to: Montana Fisheries Information System: County: Select water body from list: Fisheries Resource Values
- Waters within Federal or State protected areas (Parks, designated Natural Areas, Wildlife Refuges, etc)
- Bull trout core area waters: http://www.nris.state.mt.us/interactive.html. Go to Montana Fisheries Information System: Fish Species: Bull Trout: Partial Report: Bull trout core/nodal water body list

Secondary Waters: Secondary Waters Categories include:

- Any first and second order perennial tributaries flowing directly into Primary Waters listed above.

Tertiary Waters: These areas include all other streams.

Existing Condition is a reflection the functional state of a stream before any project impacts that would occur from an applicant's proposed project. This is a measure of the stream's natural stability and resilience relative to the physical, chemical and biological integrity of the system. The impaired waters database (303(d) list: http://www.nris.state.mt.us/wis/environet/databasechoice2.html) can be consulted to help determine the existing condition of many Montana streams.

Fully Functional means that the physical geomorphology of the reach is stable and is representative of an appropriate stream hydrograph for the topographical setting and watershed characteristics. The biological community is diverse and unimpaired by excessive anthropogenic inputs. For purposes of this SMP, a fully functional stream is one that has not been channelized; has no culverts, pipes, impoundments, rip rap or other instream manmade structures within 0.5 miles upstream or downstream; has an appropriate entrenchment ratio and width/depth ratio at bankfull discharge for its stream type relative to unimpaired stream condition based on reference reach data; shows little evidence of human-induced sedimentation; and has a wide, densely vegetated riparian buffer of deep-rooted vegetation relative to a stream's appropriate meander width.

Somewhat Impaired means that stability and resilience of the stream or river reach has been compromised, to a limited degree, through partial loss of one or more of the integrity functions (chemical, physical, biological). System recovery has a moderate probability of occurring naturally. A stream is considered moderately impaired if the entrenchment ratio and/or width/depth ratio at bankfull discharge is inappropriate for the stream type relative to unimpaired stream condition based on reference reach data; human-induced sedimentation is moderate; a moderately vegetated riparian buffer of deep-rooted or mat of vegetation is present (minimum of 25 feet); and/or culverts, pipes, impoundments, or other instream manmade structures occur within 0.5 miles upstream or downstream.

Impaired means that there is a high loss of system stability and resilience characterized by loss of one or more integrity functions. Recovery is unlikely to occur naturally. For purposes of this SMP, a stream is considered impaired if the reach has been channelized or if the entrenchment ratio and/or width/depth ratio at bankfull discharge is inappropriate for the stream type relative to unimpaired stream condition based on reference reach data and the stream has degraded to a less desirable type (e.g., Rosgen type "G" or "F"); has extensive human-induced sedimentation; has little or no riparian vegetated buffer with deep-rooted vegetation (<25'); and/or culverts, pipes, impoundments, or other instream manmade structures occur within 0.1 mile upstream or downstream.

Duration is the amount of time the adverse impacts are expected to last.

Temporary means impacts limited to construction and will not be noticeable within one year after construction.

Short Term means impacts will remain evident after one year and up to two years.

Permanent means project impacts will occur for greater than two years and likely be permanent for most types of construction activities.

Dominant Impact is the type of impact proposed that will diminish the functional integrity of the riparian system. Nine categories of impact are used.

Fill means permanent fill of a stream channel.

Pipe means to route or divert a stream through a pipe, culvert, or other enclosed structure for a distance greater than 100 feet at one specific site or crossing.

Impound means to dam a stream or otherwise convert it to a lentic state. Installation of a sediment control structure that modifies the stream to facilitate sediment control and/or storm water management is considered impoundment.

Morphologic means to channelize, dredge, or otherwise alter the established or natural dimensions, depths, patterns or limits of a stream corridor.

Detention means to place a weir in a stream to slow or to divert water when bankfull is reached. The structure should be designed to pass flows below bankfull stage and aquatic organisms.

Armor means to use rigid methods to control bank erosion or to prevent lateral channel migration and meander translation. Methodologies that confine introduction of non-stream source rock to elevations equal to or below the mean baseflow elevation, or rely use rock only to anchor large woody debris, will be assessed a Dominant Impact score of 0.2. Projects that incorporate rock above the mean base flow elevation will be assessed a score of 0.4. See Appendix E.8. for bank an explanation of bank stabilization projects for which compensatory mitigation is not typically required.

Culvert means to route a stream through pipes, box culverts, or other enclosed structures for less than 100 feet at one specific site or crossing. Culverts should be designed to pass fish and allow other natural stream processes to occur unimpeded. Culverts must not cause more than minimal changes to the hydraulic flow characteristics of the stream increase flooding, or cause more than minimal degradation of water quality. Improperly designed culverts will be assigned a higher Dominant Impact Factor. See Appendix E.9. for an explanation of culvert projects for which compensatory mitigation is not typically required.

Utility Crossing means open cut construction or other pipeline/utility line installation methods that require disturbance of the streambed and that require reestablishment of pre-project contours after installation.

Clearing and Shading means activities, such as stream bank vegetation clearing that reduce or eliminate the diversity, quantity, quality and functions of the vegetation within the riparian habitat zone. Bridge ends protected by riprap will use "armor" as the Dominant Impact category.

Collective Impact for the purpose of its use in the mitigation tables, refers to the total linear feet of stream impacted by the project (0.0005 x length of stream impacted). This factor is intended to capture the effect that more than one action may have on an aquatic resource (i.e., rip rap may be proposed along several separate reaches of the same stream and the factor will result in an increase in debit responsibility).

1.2. Riparian Credit Factors

Area Restored refers to the percentage of the area proposed as buffer credit that is to be revegetated with native riparian species.

Net Improvement for Riparian Enhancement is a measure of the enhancement attributed to the restoration and perpetual protection of streamside buffers and is calculated using the tables in Section 14.2. There are tables that determine the minimum required buffer width and a credit value matrix for different combinations of vegetative restoration and buffer widths.

Type of Protection means the legally binding mechanism applied to ensure that land and aquatic resources offered for mitigation are protected in perpetuity from changes other than protection of the aquatic resource. Five different types of protection are recognized, with varying levels of security.

Permit Conditions means the mitigation site does not have any legal encumbrance protecting it other than special conditions associated with a Corps permit. This alternative may not be acceptable in all cases.

Covenants means covenants enacted and enforced by a developer or property owner association for a given subdivision.

Deed Restriction means a private individual or property owners association attaches a restrictive covenant to the property deed. entity holds a conservation easement on a mitigation site. A conservation easement granted to a qualified, experienced, non-profit conservation easement or government agency. The mitigation site is protected by a conservation easement held by a private individual or entity.

Conservation Easement means a qualified, experienced, non-profit conservation organization or a government agency holds a conservation easement for the mitigation site. The easement is enforceable by the easement holder.

Fee Title means a transfer of complete ownership to a qualified, experienced, non-profit conservation organization or government agency.

Timing means the relative time when the mitigation will be performed in relation to when adverse impacts to aquatic resources will occur. Note that, for projects other than mitigation banks, schedule 5 is unlikely to be approved. All credit withdrawals associated with mitigation banks must be able to meet interim success criteria commensurate with the level of credit withdrawal. Related terms include:

Schedule 1. For mitigation not involving banks it means that all mitigation is done prior to the adverse impacts. For mitigation banks this means that no credits may be withdrawn prior to final determination of success.

Schedule 2. For mitigation not involving banks it means the majority (75% or greater) of the mitigation is done prior to the impacts and the remainder is done concurrent with or after the impacts. For mitigation banks this means no more than 10% of the credits may be withdrawn prior to final determination of mitigation success.

Schedule 3. For mitigation not involving banks it means the mitigation is concurrent with the adverse impacts. For mitigation banks this means no more than 20% of the credits may be withdrawn prior to final determination of mitigation success.

Schedule 4. For mitigation not involving banks it means that 50-75% of the mitigation is done concurrent with the impacts and the remainder is done after the impacts. For mitigation banks it means no more than 30% of the credits may be withdrawn prior to final determination of mitigation success.

Schedule 5. For mitigation not involving it means that less than 50% of the mitigation is done before adverse impacts occur. For mitigation banks it means more than 30% of the credits may be withdrawn prior to final determination of mitigation success.

Kind is a factor relative to the functions of the mitigation site to the impacted site. The stream order of the mitigation site is compared to the stream order of the impacted site.

Category 1 means the functions lost at the impacted stream will be mitigated through restoration or preservation of a stream of the same order.
Category 2 means the functions lost at the impacted stream will be mitigated through restoration or preservation of a stream order no more than one order different than the impacted stream.
Category 3 means the functions lost at the impacted stream will be mitigated through restoration or preservation of a stream of two orders difference from the impacted stream.

NOTE: Proposals to mitigate adverse stream impacts at a stream of greater than 2 stream orders difference will generally not be accepted.

Stream Order. Stream order refers to the origin and location of a stream proceeding from the highest, uppermost headwater areas of a watershed to the lowermost streams.

First Order streams are those (ephemeral, intermittent or perennial) channels that are above the junction with another first order stream.

Second Order streams are those (ephemeral, intermittent or perennial) channels that are formed by and begin at the junction of two first order streams.

Third Order streams are those (ephemeral, intermittent or perennial) channels that are formed by and begin at the junction of two second order streams.

Greater Than Third Order are those that include all fourth order or larger streams, each formed by the combining of another stream of equal or greater magnitude than third order.

Location is the relative location of the mitigation site to the impact site. For stream mitigation banks, location will be defined for the bank after an assessment of the banking proposal.

Onsite means within ½ mile up or downstream of the impact, but still on the stream that is adversely impacted by an applicant's proposed project.

Offsite means greater than ½ mile from the impact site on the adversely impacted stream but still within the watershed (8-digit HUC as mapped by USGS). See http://www.nris.state.mt.us/nsdi/nris/subbasin.gif

Outside Watershed means the mitigation site is not within the same watershed as the adverse impacts but within the same Major Montana Watershed Basin (MMWB). See map on page 48

Note: In general, mitigation outside the impacted stream's MMWB will not be acceptable.

1.3 Stream Restoration Credit Factors

Net Improvement for Stream Channel Restoration is a measure of restored stream channel stability (see Appendix C. for definition). Stable streams area in dynamic balance and have proper morphology relative to the physical characteristics of the watershed. Improvements in stream stability relate directly to improvements in stream functions.

Substantial stream channel restoration actions include:

- Removing stream impoundments and/or pipes or culverts to restore a stream reach to a stable, appropriate channel configuration as per undisturbed reference stream reaches.
- Restoring appropriate bankfull discharge width, stream sinuosity, entrenchment ratio, length and width/depth ratio to a referenced morphologic pattern.
- Building a new, morphologically stable channel at a higher elevation to connect it to the floodplain.
- Creating or re-connecting floodplains adjacent to streams artificially disconnected from their floodplain.
- Where relocation of an incised stream is impracticable, modifying the existing channel and re-establishing a floodplain *in situ*, but not at the abandoned/disconnected floodplain.
- Construction of off-channel storm water detention facilities in areas where runoff is accelerating.
- Implementing restoration activities that will improve water quality or reduce sedimentation in streams designated as *Primary Waters* under Stream Status in Section 1.1 of this appendix.
- Removing a dike, levee or berm that is within the 100-year floodplain to re-connect the floodplain to the stream channel.
- Reconnecting abandoned side channels or meanders that were artificially cutoff or blocked.
- Removing rock riprap and stabilizing disturbed surfaces with biodegradable erosion control fabric and vegetation.

Moderate stream channel restoration actions include:

- Restoring stability in highly eroded areas or areas with artificially accelerated erosion, using non-rigid methods such as vegetative stabilization, root wads with a relatively small percentage of rock, resloping and reshaping banks and creating a vegetated floodplain bench.
- Restoring natural channel features (i.e., riffle/run/pool/glide habitat) using morphology appropriate to target stream type, but not a complete channel reconstruction/relocation.
- Where relocation of an incised stream is not practicable and modifying the existing channel to create a stable stream channel is impracticable due to belt width constraints (limited land width available to form the meanders necessary for C or E stream types), modifying the existing channel and floodplain at its current elevation to create a stable channel. This converts the stream to a new stream type at the existing elevation of the channel but without an active floodplain.
- Routing a stream around an existing impoundment by creating a morphologically stable and appropriate stream channel.
- Constructing fish ladders, where appropriate.
- Replacing inappropriately sized or installed culverts with a bridge.
- Livestock exclusion with riparian vegetation restoration (see Section *14.3*, pg 16).

Minimal stream channel restoration actions include:

- If it is documented that accelerated erosion is evident, restoring stream bank stability by hardening or stabilizing the existing channel in place. This is the least desirable option biologically and aesthetically. It should only be allowed when there are insurmountable constraints to using other restoration solutions, as may be the case in urban settings. Some proposals undertaken by this methodology may be considered to have adverse aquatic impacts and require compensatory mitigation.
- Incorporation of a bankfull planting bench into a rock riprap project.
- Culverting floodplains at existing road crossings to facilitate flood flows.

- Replacing inappropriately sized/designed culverts to a larger size and/or configuration.
- Removing check dams, weirs, car bodies and other foreign and artificial instream structures and debris where these structures are contributing to bank erosion or scour or blocking stream processes and aquatic organism movements and any time in general when foreign materials/junk is removed.
- Livestock exclusion without riparian restoration, livestock water gaps (see Section *14.3,* pg 16).

Note: No mitigation credit is provided for constructed channels that do not incorporate the principles of natural channel design.

Stream Status: see Appendix G, Section 1.1

Type of Protection, Timing, Kind, Location: see Appendix G, Section 1.2

Major Montana Watershed Basins